



# Broadcast News

Volume No. 150, August 1973



San Francisco Bay Area Viewers  
Turn to the Tower . . . The Sutro Story



# The Automatic Color Camera

## Comes the Evolution!

- 1969** RCA introduces the TK-44A, a new generation of color cameras.
- 1970** New features added. New colorplexer, miniature cable and equalizer. Improved camera cable and joystick control panel.
- 1971** The TK-44B. With more new features. Bias Light to reduce lag and RGB coring to minimize noise at low light levels. Scene Contrast Compression to bring out details in high-contrast scenes.
- 1972** First automation designs demonstrated at NAB.



## 1973. The TK-45A.

What's behind our new TK-45A color camera system is a four-year tradition of dynamic design advances in our TK-44 Series. The result: a reputation for producing the highest quality pictures in the broadcast industry.

Now, the TK-45A offers an even higher standard of excellence. Because it does everything the TK-44 does. And more, automatically.

So the TK-45A is easier to operate. And there's less that can go wrong.

White level is set by simply focusing on a white area of the scene being shot (or a white reference

card) and pushing a button.

Black level is automatically set every time the lens is capped.

And should lighting conditions change, the new automatic iris compensates without the help of an operator.

There's automatic centering, too. It saves you setup time by correcting registration errors fast.

The new circuitry has been incorporated into a newly designed camera control unit, which reduces the number of interconnecting cables. So clutter is kept to a minimum.

With all its time-saving automatic features, the TK-45A makes top operating efficiency possible. It lets your station produce the best color pictures ever.

In other words, The TK-45A sees things your way. Automatically.

For details on its performance, and the cost-effective design approach behind it, contact your nearest RCA representative.

**RCA**

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**Broadcast News**

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OUR COVER  
From atop Mt. Sutro, the familiar panorama of San Francisco and the Bay unfolds below. The Sutro Tower rising in the foreground now provides the single source for TV signals in the Bay Area.



## Broadcast Systems Organization Changes Accent Quality, Service, Training

Three changes in the RCA Broadcast Systems organization announced by Neil Vander Dussen, Vice President, are directed to improving customer interaction in the areas of quality, service and training. F. D. Galey is the Manager, Product Assurance, and now reports directly to Mr. Vander Dussen. In this new function, emphasis will be on product assurance at the factory level, to minimize field service requirements. In addition, Mr. Galey will have direct customer contact and follow-up responsibility to expedite resolution of any problems in the field.

Daniel G. Mager, Tech Alert, heads an enlarged staff with added responsibilities. Since it was set up in 1971, Tech Alert has filled a much-needed function: that of providing customers with a direct access point for answers to technical product questions, warranty service and parts assistance, modification information and related data. To this has been added a new assignment: liaison with Parts & Accessories. The goal is to maintain adequate inventory for present and future requirements, while effecting economies through conjunctive purchasing.

As Manager, Broadcast Technical Training, John W. Wentworth heads a new organization established to develop and operate technical training programs for customer personnel.

Technical seminars for broadcasters on major RCA equipment have been operated for some time. The new Training function will extend both the scope and the content of these Camden-based programs and will be involved in preparing training materials which can be utilized by the product user at his location.



F. Dean Galey has made quality his career—first in the aerospace industry, and for the past 24 years at RCA. Now, as Manager, Product Assurance for Broadcast Systems, a new opportunity for applying that experience is

opened. Reporting to Neil Vander Dussen, Dean serves as an ombudsman for RCA customers, as a liaison between the factory, engineering and the product user, and as a quality control specialist. He is filling this role for Broadcast Systems in RCA plants in Camden, Meadow Lands, and Jersey Island (G. B.).

Product quality in the field is a concern of Dean Galey, and customer contact is a part of his function. A number of innovative steps have already been taken. "For example," Mr. Galey notes, "there was a serious communication delay in obtaining feedback from customers and RCA field personnel regarding quality situations. Now, a computerized data form with built-in return reply substantially shortens this lag time, and at the same time pinpoints trouble areas. Equally, if not more valuable, is the prompt identification of recurring problem areas to permit cutting in changes much earlier in the production cycle."

Mr. Galey is also addressing the important task of assuring quality in the product before it leaves the shipping dock. New programs are being implemented to provide more effective internal controls so that potential defects will be minimized. More intensive product check-out is being performed on all products. Final test procedures are geared to customer-oriented specifications rather than the standard factory specs. Galey notes. "Emphasis in testing now is directed toward user performance rather than a trouble-shooting routine."

He also sees the role of product assurance as an active rather than passive one. "We must be responsive to customer needs and take positive steps to assure them that reliability and quality are synonymous with RCA. We have reached the point where users are more demanding, equipment is more sophisticated, and mediocrity cannot be tolerated."

Dean Galey can be reached in Camden on Ext. PC-2271.



Two years ago, Tech Alert started as an idea—and a staff of two product specialists and a telephone girl. It was such an instant success that more people and more responsibilities were soon added.

Today Daniel G. Mager, Manager, Tech Alert, heads an operation that includes 12 people and has a very busy phone complex in the RCA Camden plant—reached at extension PC-3434. This multiple extension puts customers into immediate touch with a specialist on cameras, tape, audio, terminal, or transmitters. The service includes an emergency after-hours and weekend contact. "After-the-sale" follow-up is a key function of Tech Alert. This encompasses initial check-out of major products, particularly cameras and tape equipment. Performed at the customer location after delivery and set-up, this check-out assures optimum performance. Warranty field service and retrofit modifications are also on the Tech Alert assignment list. With the inside product specialist and the field service organization, Tech Alert's staff now numbers more than 40.

Because of Tech Alert's close ties with customer needs and problems, the activity has been given new responsibilities in user-related functions. Mr. Mager is now the Broadcast Systems liaison with Parts & Accessories. A part of this assignment is to assure continuity of spare parts availability for major products. Another task handled by Tech Alert is equipment refurbishing, which is performed at a separate facility known as the "CRAE Shop" (an acronym for **C**ustom **R**epair **A**nd **E**ngineering). This group is equipped to update customer equipment on request.

Dan Mager has had the diversity of experience required to handle the Tech Alert job. During his more than 13 years with RCA, he has had administrative assignments in Order Service, Contracts, Proposals, Inventory, and Subcontracting. At the RCA Meadow Lands plant, Dan served as Manager, Engineering Projects and Administration. Prior to assuming the Tech Alert position, he was an AM product specialist. Tech Alert is an investment in product service which Broadcast Systems believes provides a vital link between RCA and the customer.



The appointment of John W. Wentworth as Manager, Broadcast Technical Training, is the classic case of a perfect matching of man and function.

John is uniquely qualified for the assignment. During his nearly 25 years at RCA, he has covered a remarkably wide range of assignment. Starting as a design engineer, he advanced advanced to Engineering Manager, and subsequently headed RCA's Educational Electronics activity. More recently he served as Manager, Engineering Educational Programs; in 1968, he was named Director, Educational Development Engineering. Before re-joining Broadcast Systems, he was Director of Operations for RCA Institutes. He has lectured extensively on television and electronics and has authored several texts, including the pioneer work, "Color Television Engineering".

The Broadcast Training organization will develop and operate programs for customer personnel and company employees. The activity is located in Camden, N. J., and includes a fully equipped demonstration studio and classrooms. In addition to "hands-on" training, plans call for extensive use of audio and video tape recordings as learning aids for training here and in the field. Between 350 and 400 TV station engineers, as well as teleproduction and CCTV system technical personnel attend RCA Broadcast Systems seminars each year.

Under John Wentworth's direction, a number of innovations in training methods and in course content are contemplated for the near future. These include a greater emphasis on "hands-on" instruction, with smaller classes. Also team-teaching techniques are planned to make training sessions more dynamic and effective. "Mini" courses are in the offing for those who need operational and trouble-shooting instruction, but who do not require in-depth maintenance and repair training.

In revitalizing the training activity, yet another area to be explored is holding regional and even individual customer seminars which will permit expanded participation.

Furthermore, by packaging course materials and using video media it is hoped that even broader exposure to product operational and maintenance data can be achieved.



# Skylab Electronic Systems

## A Mix of Tried and New

While much new equipment was developed for the Skylab mission, it is interesting to note that there is also a large complement of space-proven hardware that performed successfully in earlier space missions.

For instance, six systems designed and built by RCA for Skylab all have seen prior service in other major NASA programs such as Apollo, the Earth Resources Technology Satellite (ERTS) and Gemini.

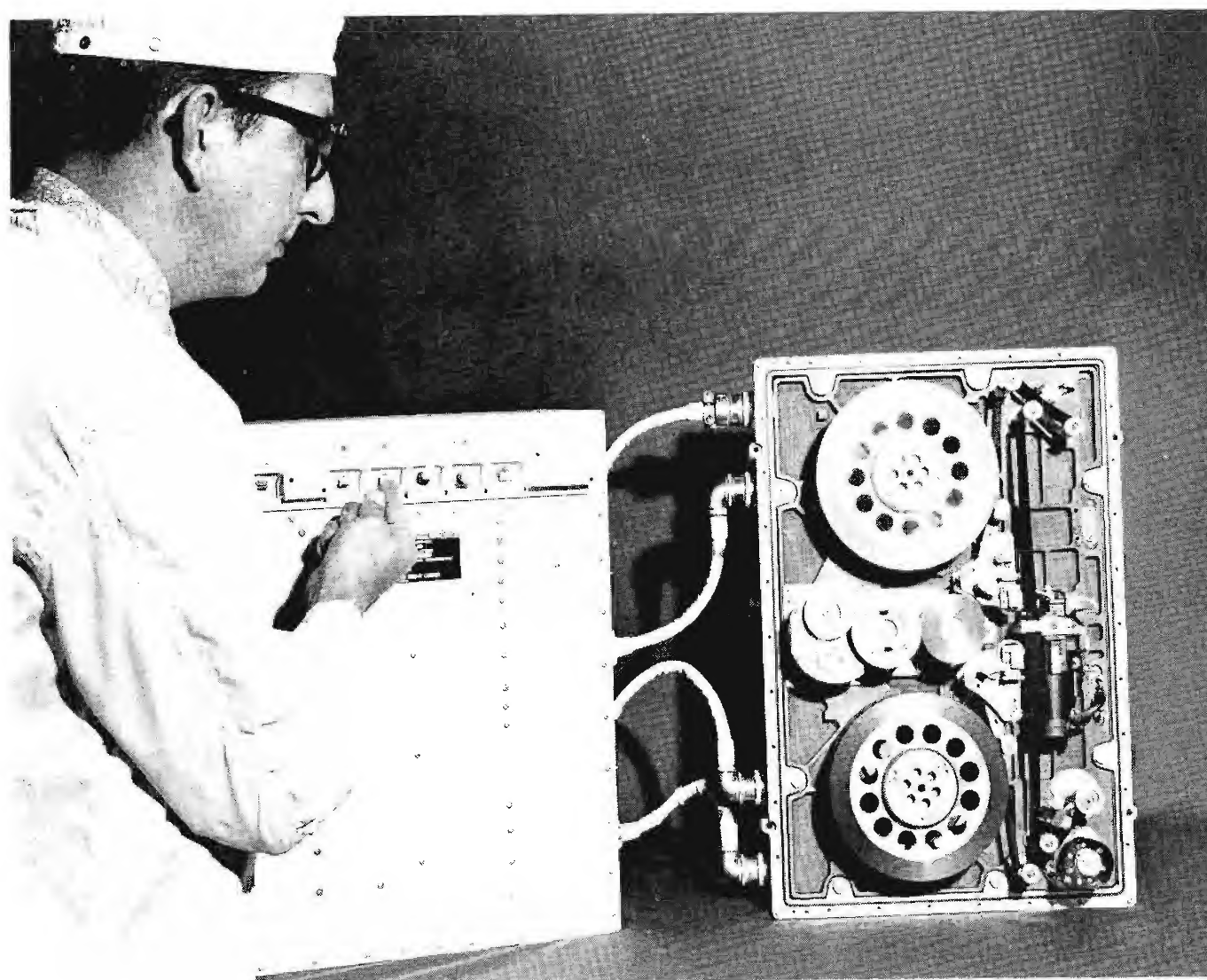
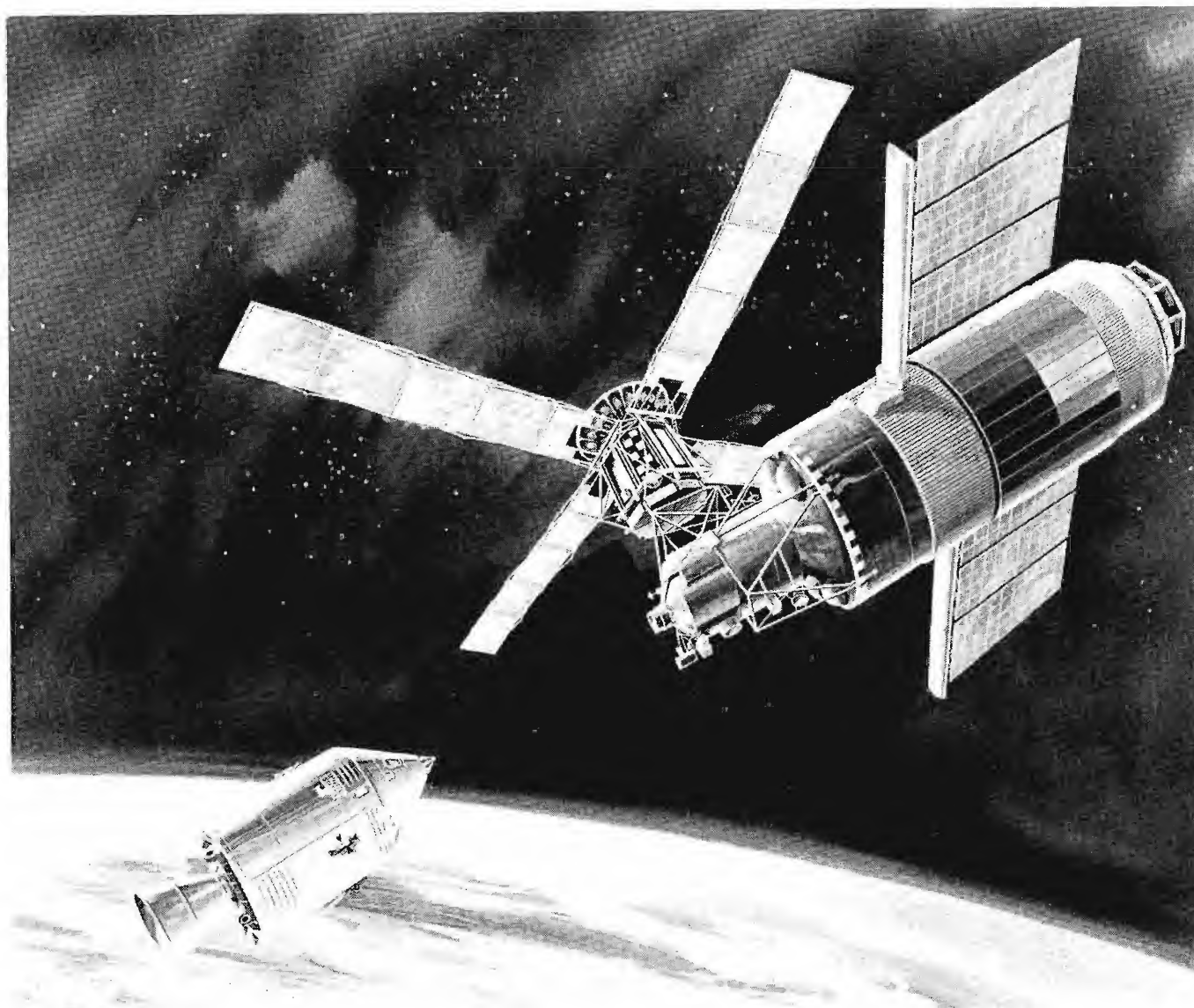
Four of these RCA systems—the video tape recorder, VHF ranging system and the telemetry recorder and transmitter—are flying with the Orbiting Workshop (OWS) while the other two—the Saturn countdown computer and tracking radar—provide ground support.

The use of these tried and proven reliable systems on Skylab demonstrates the continuing value of the vast storehouse of technology created by NASA in its space programs.

Artist's rendering (top right) shows how Command Service Module (CSM) docks with Orbiting Workshop (OWS) during the Skylab mission. Assisting in the docking is the VHF Ranging System designed and built by RCA. The system provides the CSM pilot with the range between the two spacecraft.

An out-of-this-world video tape recorder (right) is given thorough, down-on-earth testing at RCA before flying the Skylab mission. The system helps NASA provide home viewers with color television coverage of the astronauts as they conduct scientific and technological experiments in their spaceborne workshop.

The Skylab VTR accepts field sequential color television pictures taken by the astronauts of the experiments they are performing. The system stores the pictures and transmits them to ground stations for retransmission to the Space Center in Houston where they are converted to NTSC color standards for broadcast. The recorders are designed for a space life of 1000 hours. The system is composed of two units: a transport package and an electronics package. The recorder employs a transverse scan headwheel arrangement with a head-to-tape speed of 2000 inches per second. 2000 feet of 2-inch wide video tape is used. The wide-band recording electronics are functionally similar to those used in conventional broadcast television recorders such as the TR-70.





## TK-28 Finds its Way into Telecine Operations Around the World



Response to the new TK-28 film camera bears out a well-supported axiom—that broadcasters soon recognize a good thing.

It could be the automated functions; the innovative design; exclusive color balance; automatic level control; the pre-selectable Chromacomp—or even the choice of 3 vidicons or 3 lead oxide tubes.

More than likely, all of these features figure in broadcaster preference for the TK-28. But the real clincher is in the performance—the uniform, high quality color reproduction achieved with films of all types and conditions.

Following is a list of world-wide shipments of the TK-28.

KOLR, Springfield, Mo.  
KOCO, Oklahoma City, Okla.  
KTAR, Phoenix, Ariz.  
KRWG, Las Cruces, N. M.  
KTBS, Shreveport, La.  
KUED, Salt Lake City, Utah  
KTVW, Tacoma, Wash. (2)  
WAAY, Huntsville, Ala.  
WBIQ, Birmingham, Ala.  
WHA, Madison, Wisc.

WSKG, Endicott, N. Y. (2)  
WISN, Milwaukee, Wisc.  
WPNE, Green Bay, Wisc.  
WTAE, Pittsburgh, Penna.  
WTLV, Jacksonville, Fla. (2)  
WTVT, Tampa, Fla.  
WUOM, Ann Arbor, Mich.  
WGTE, Toledo, Ohio  
WYAH, Portsmouth, Va.  
WRLK, Columbia, S. C.  
WUCM, University Center, Mich.  
WEWS, Cleveland, Ohio  
WDSM, Duluth, Minn.

CFTO, Toronto, Canada  
CKBI, Prince Albert, Canada  
CFCN, Calgary, Canada (2)  
CFTM, Montreal, Canada  
CFAC, Calgary, Canada  
Canal 12, Monterrey, Mexico  
ORF, Vienna, Austria (8)  
TVQ, Brisbane, Australia  
Westward TV, Plymouth, England  
TV Bahia, Bahia, Brazil  
Data Communications, Paris, France  
TV Gaucha, Brazil  
TV Anhangueria, Brazil  
BTV, Ballarat, Australia  
Ft. Benjamin Harrison, Indiana  
Ft. Monmouth, New Jersey (2)  
State of Wisconsin,  
Madison, Wisconsin (2)  
U.S. Air Force Academy,  
Colorado Springs, Colorado  
U.S. House of Representatives Recording  
Studio, Washington, D. C.  
Trans World Productions,  
Las Vegas, Nevada

## First Ampex Mark X Headwheel Joins RCA 1000 Hour Club

The distinction of being first in the 1000 Hour Club for RCA reworked Ampex Mark X headwheel panels goes to WTVS, Detroit. After registering 1150 hours, the first panel is now back at RCA for rework. It was installed June, 1972.

Director of Engineering Ed Hendry notes that two of his three Ampex VTR's are now equipped with RCA re-built headwheel panels with Alfecon II material. The second headwheel is also approaching the 1000 hour mark and will be joining the "club" soon. Ch. 56 also operates two TR-70C tape machines and has previously qualified for the 1000 hour club with one of these headwheel panels.





## 100,000 Plays . . . and Counting

The TCR-100 installed at WAPA-TV, Ch. 4, San Juan, is clicking off "cart" plays at an amazing clip. It has already registered over 100,000 operations in little more than a year.

In doing so, the Ch. 4 "cart machine" has eliminated the daily prepared "station break" reel machine workload. As a result, the seven reel-to-reel recorders are liberated for production work. This added capacity is needed, since WAPA-TV produces video tape shows for themselves and for their sister Spanish-speaking station, WNJU-TV, Ch. 47, Newark, N. J.

Juan Gonzales, TV Tape Supervisor (left) and Julio Brito, Chief Engineer, discuss performance of WAPA-TV's TCR-100 which has already logged more than 100,000 plays.



## TCR Shipments for Europe Now Being Made from RCA Jersey Ltd.

To accommodate growing European broadcaster requirements for the TCR-100, the RCA facility on the Channel Island of Jersey (RCA Jersey Ltd.) is now being utilized as the supply source for "cart" machines sold to the European market.

This is an expansion of the Jersey plant in supporting video tape equipment needs for the Continent. The operation has for the past year been the final assembly, test and shipping point for RCA TR-70 and TR-60 tape machines.

The modern facility shown in the photo (right), was specifically designed and equipped for efficient production, assembly and test of broadcast electronic equipment and systems.





# WUTV: The "New Kid" is Making it in Buffalo

WUTV's technical staff is headed by dynamic Chief Engineer Gary Cooper (right) and Ass't Chief George Berk.



WUTV Buffalo is different. It has to be to survive as the only commercial "U" serving the market. Located away from the pack—on Grand Island, in the middle of the Niagara River—it serves up a special blend of programming which is attracting a sizeable audience.

Since Channel 29 went on air in late December, 1971, the Buffalo TV market hasn't been the same. Like the "new kid on the block", WUTV quickly proved that a young upstart *could* make it in head-to-head competition with entrenched, network-affiliated "V's".

The combination of a totally new facility, a sharp, strong color signal and independent counter programming has resulted in a substantial share of audience rating and advertising support.

The youthful image of WUTV is reflected in the two engineers who designed the plant and put it on the air. Gary Cooper, Director of Engineering, is just 30 and George Berk, Assistant Director a vigorous 35 year-old. Because of their foresighted planning and the solid support of their management, the station has not had to make a major equipment investment since going on the air over 2½ years ago.

## Efficient Operating Layout

Except for a single audio console, WUTV is "RCA all the way"—from its TFU-30J Pylon Antenna and 60 kW Transmitter to tape, film, switching, TCR-100 and TK-44's.

The equipment is laid out for optimum efficiency. It had to be, since WUTV operates a "lean ship". While on the air, the Master Control room is a 2-man operation. One man operates the switcher, loads films, slides and audio carts and maintains the programming and commercial schedule. The engineer monitors the transmitter remote readings, loads the tape and cartridge machines and adjusts video and audio levels, including camera shading.

News in sign language for deaf is presented daily on TV-29, with announcer off-camera doing "voice over" simultaneously.







Youth is served at Ch. 29, Buffalo. Dan Taylor (left) who took the photographs used in this article, was recently promoted to Film Director. With him is Ass't Director Jim Stratton.

### **An Alternative to Network Schedules**

WUTV's General Manager, Herman Pease is enthusiastic about the impact Ch. 29 has had on Buffalo television. "The station's success," he says, "stems from the fact that Ch. 29 provides an alternative service to the community—another choice in programming."

During the afternoon and early evening hours, the program schedule includes wholesome entertainment with appeal to the entire family—such as the surprisingly popular "Ozzie and Harriet" series. Movies are programmed for the prime time period. In addition, WUTV carries a hefty sports schedule, including independent packages as well as network offerings not carried by the local affiliates. Pre-empted network shows which do not run on the local "V's" are also picked up by Ch. 29 on a selective basis. This season, the ABC "Wide World of Entertainment" show is carried by the station.

### **Counter-Programming Pays Off**

Mr. Pease notes that "counter programming is the name of the game for the independent UHF station to compete successfully against the established network outlets."

The station has built a strong, loyal following among the 18-49 age level audience. The programming for this mixed group combines nostalgia for the older members and new appeal for the younger adults.

The correctness of this counter-programming strategy is mirrored in the ratings. "Ozzie and Harriet" scores a "13" rating in the news-dominated 6 P.M. time slot. "Hogan's Heroes" does even better, with a "15" in the 7:30 P.M. opening prime time period.

Indicative of the inroads made by Ch. 29—it is now #2 in the market during the 3:30 P.M. - 7:30 P.M. period.

### **"News Capsule" Format**

In news programming, TV-29 does not duplicate the in-depth coverage of the other stations. Instead, their format features two-minute "News Capsules" every hour, with a five-minute newscast at 10:55 P.M. The 6 P.M. News Capsule is unusual in that it is handled "voice over" by the announcer, while one of the teachers from nearby St. Mary's School for the Deaf is on-camera, presenting the news via sign language for this small, largely neglected audience.

Recognizing the need for having different viewpoints expressed, the station airs a weekly "Kaleidoscope" show hosted by Roger Lund, a station Vice President, which offers that opportunity to any group or organization with something to say.

There is also the expected emphasis on public service and local interest programming: "Niagara Now"; "Basic Black"; "Buffalo Unlimited"; "Interview", and "Mass for Shut-ins".

### **Lower Cost Lures New Sponsors**

WUTV's entry into the market and its aggressive promotional and sales effort has provided yet another service. It has brought a whole new group of sponsors into television—smaller retailers of all types. The high percentage of renewal business from this group, Mr. Pease notes, shows that they have found TV to be a successful advertising vehicle.

Ch. 29's success, Mr. Pease affirms, can be attributed to a number of factors, including the station's excellent signal, its superior technical equipment, and a competent young staff. Add to this list a growing share of audience, a lower rate card, and quality production at reasonable cost—and it's easy to see why WUTV has attracted a roster of new sponsors.

The advertising mix at TV-29 is divided about evenly between national and local sponsors.



Tall TV-29 tower serves as a landmark for its Grand Island location. The building at the base of the tower houses transmitter, studios and offices.

**WUTV-29**  
Grand Island, New York



#### Station Site Covers Buffalo and Canada

The Grand Island location proved ideal for WUTV. It not only gives them an excellent signal into metropolitan Buffalo and surrounding areas, but it also reaches a large Canadian audience. Ch. 29 is picked up by a number of Canadian cable systems, including those in Toronto and others as distant as 120 miles. Because of this extra coverage, the station picks up some advertising from Canada.

The Ch. 29 antenna is a TFU-30J Pylon omnidirectional, with a  $\frac{1}{2}$  degree beam tilt, mounted on a 900 foot tower. The antenna, combined with the 60 kW TTU-60 Transmitter provides a one-megawatt signal which extends out beyond the normal range, due to the flat terrain in the area.

#### Transmitting Facility

The antenna and transmitter as well as the studio and administrative offices for WUTV are on the same Grand Island site. Although the transmitter is in the room adjoining Master Control (a distance of perhaps 20 feet) it is remote controlled via a BTR-30A system. This arrangement is not a luxury, but an extension of the Ch. 29 philosophy of efficient, economical operation.

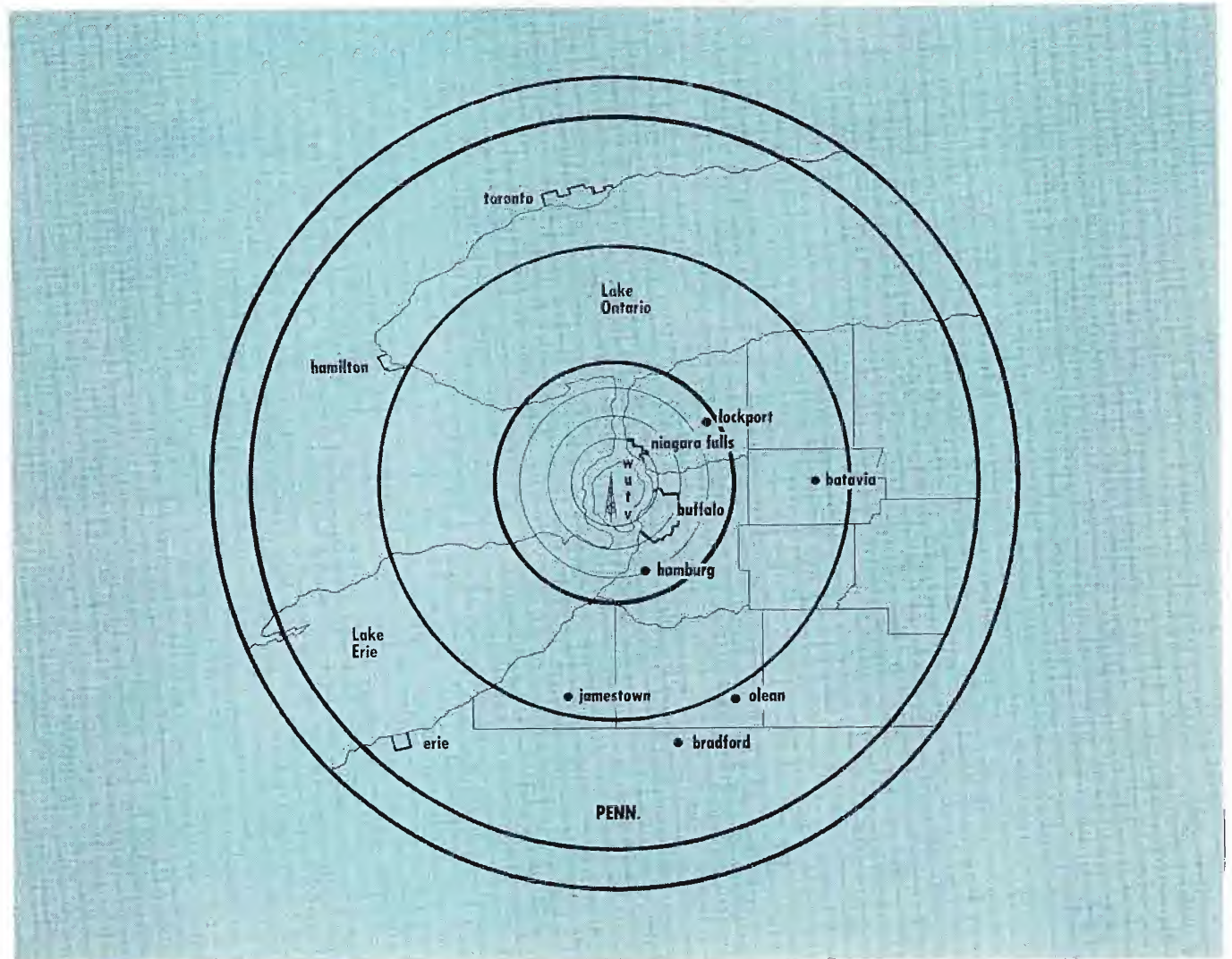
The TTU-60 has had an excellent reliability record, with only three hours of outage in over 2½ years of operation. This was the first transmitter to be ordered with an RCA klystron. Power distribution for the transmitter is installed in the concrete flooring rather than overhead. Gary Cooper noted that this reduces the possibility of hum-causing AC fields, clears the overhead clutter, and also keeps the wire cooler in hot summer weather.

The heat exchanger is isolated in a separate room and is covered with asbestos, which keeps the internal heat down and also reduces the noise level.

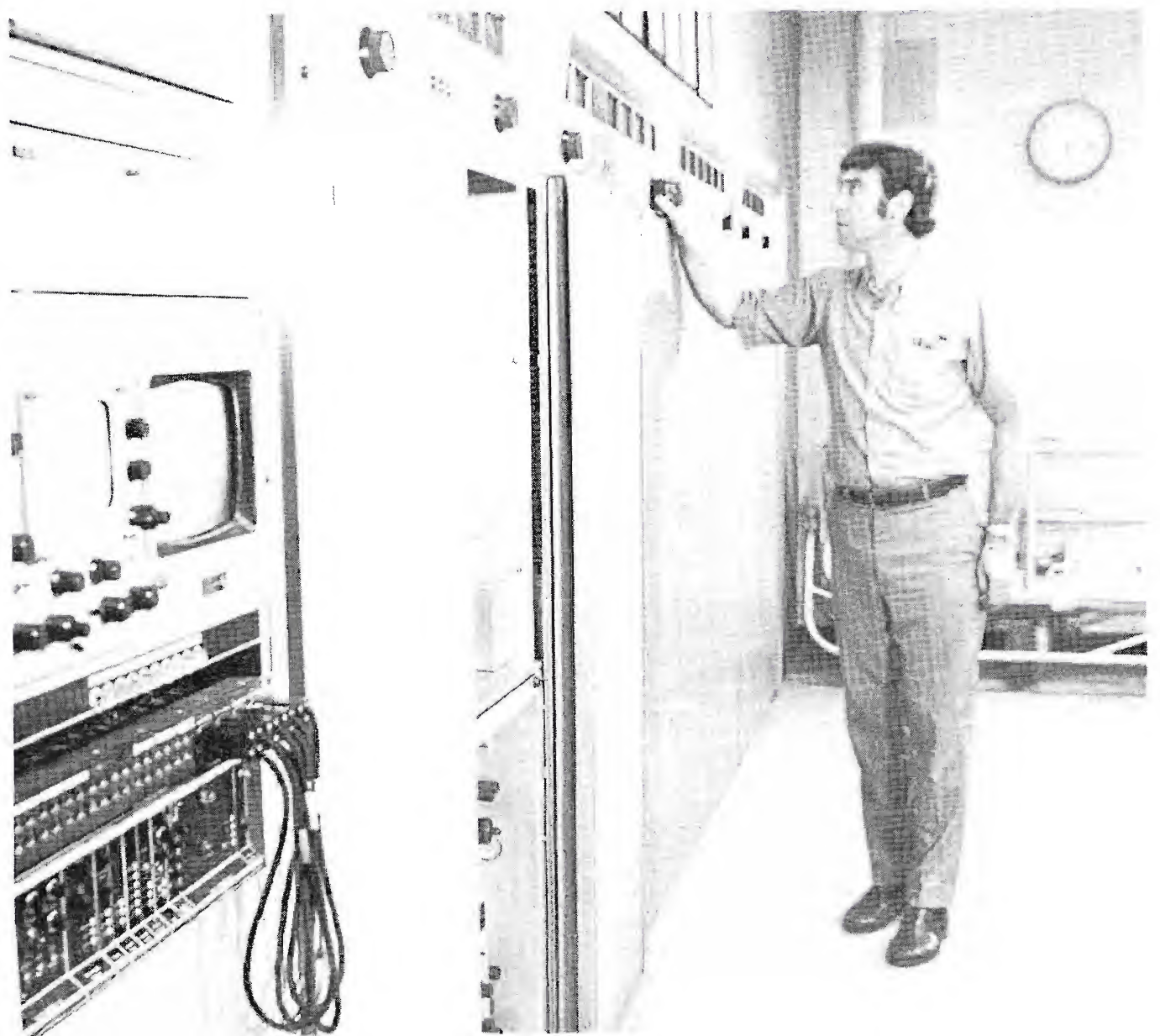
Not satisfied with the performance of the station's Wattmeter, George Berk devised a calorimeter which provides a more accurate measure of power by measuring the input vs output water temperature into the dummy load. Measuring the change in temperature through a flowmeter gives an accurate indication of the output power of the transmitter.

The transmission line in the transmitter room from the tower to the patch panel is spring-loaded to compensate for temperature variations which affect the expansion and contraction of the copper. To date there have been no nitrogen leaks.

Flat terrain extends WUTV signal pickup range.

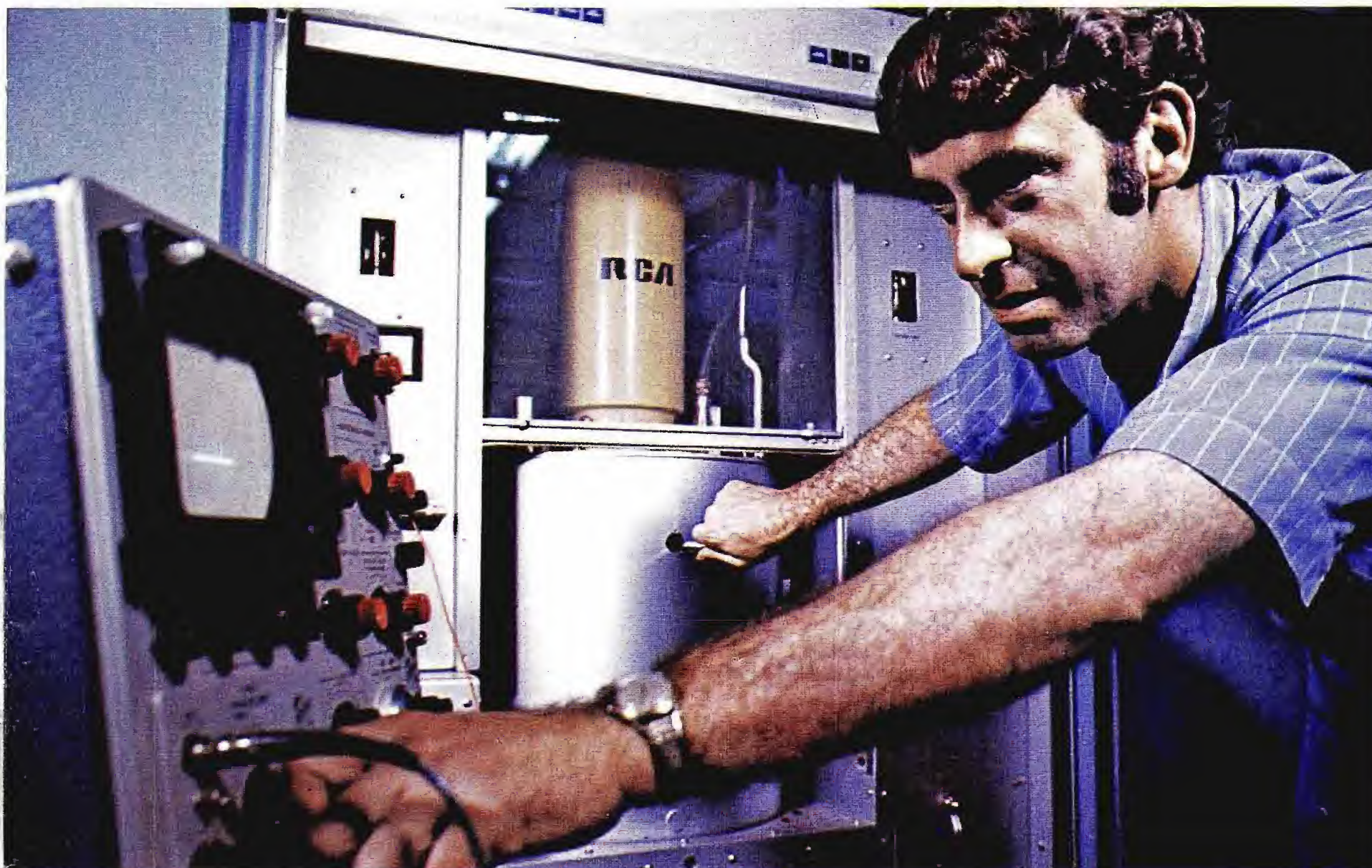


Although located adjacent to Master Control, WUTV's TTU-60 transmitter is remote-controlled.



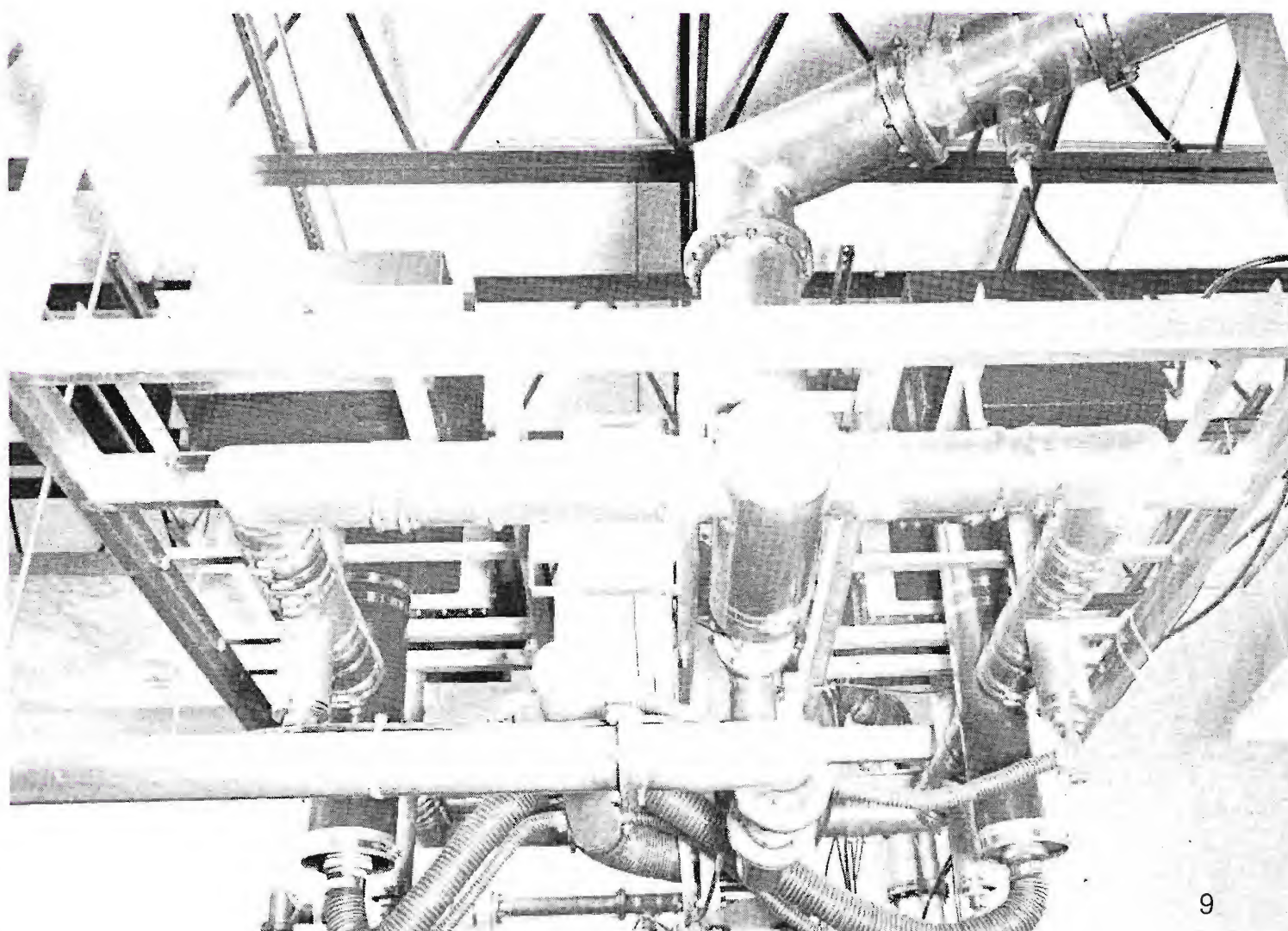
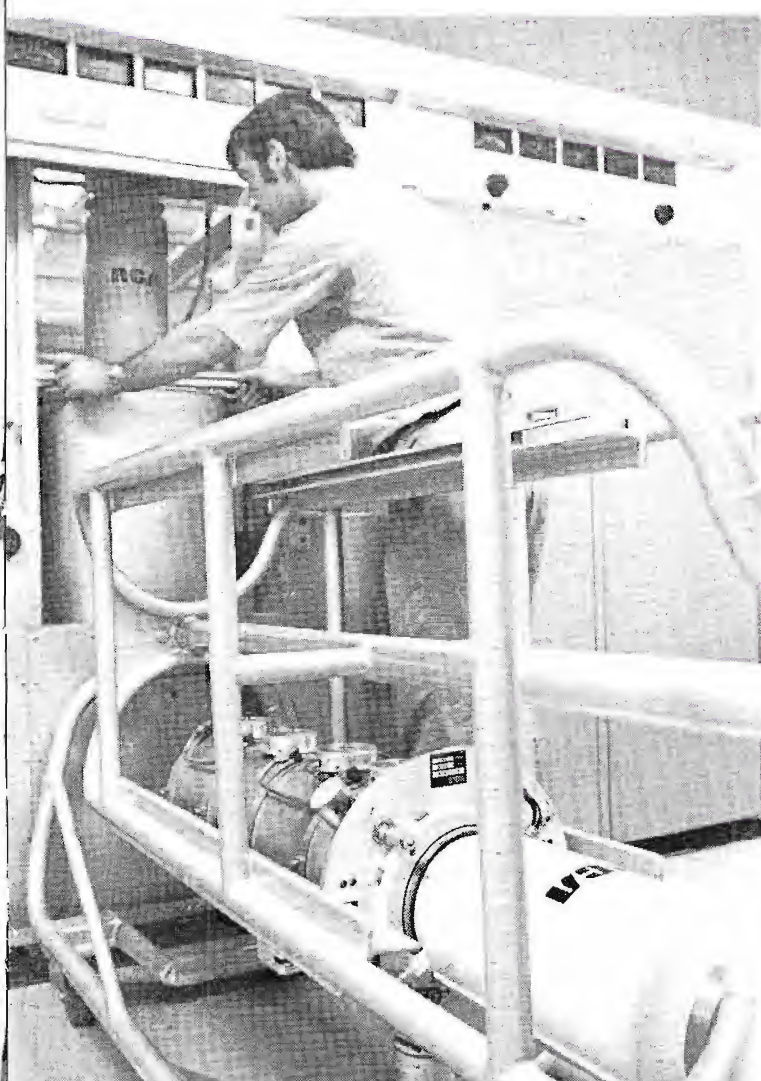


Engineer Bob Bello makes measurements on transmitter.



Carriage arrangement permits quick change of klystron when needed.

Transmission line is spring-loaded to compensate for temperature variations.





### Master Control: Clean, Cool and Busy

Since it is so vital to the daily operation, Master Control is treated with tender, loving care. It is fitted with a computer flooring which houses the wiring and air conditioning ducts. The terminal racks are exposed directly to the air-flow from the air conditioning system and run especially cool. Room temperature is maintained at a constant year-round 70°, and the humidity is controlled. So is the environment. There is an ironclad rule in effect forbidding smoking or eating in Master Control. These factors, coupled with a preventive maintenance program, have made the WUTV operation run smoothly with a minimum of component failures.

### Switcher Designed for 1-Man Operation

The Master Control Switcher is a "Cooper/Berk" design which makes it possible for one man to operate the system efficiently. On-air switching is handled via a TS-51 System 7, audio-follow-video. The switcher can handle basic mixing, laps and inserts, although these are not usually done during on-air operation. The Master Control switcher is used, however, for dubbing some "carts", such as those involving dealer "tags". These can be made while Production is using their own switcher and the VTR's.

The Master console has remotes for all program sources on one panel, including four tape sources plus the TCR-100; two film chains; TK-44's, and audio carts.

In front of the console are eight racks which house the terminal equipment; audio and video controls; transmitter remote controls; VITS generator, audio patch panels and shading controls for live and film cameras.

Two TK-27 film islands, each complete with two TP-66's and a TP-7 are in constant use for programming, production and commercial playbacks. Again, the performance record of these systems has been outstanding, Mr. Cooper notes. Even competitive stations have commented on the consistent color quality achieved.

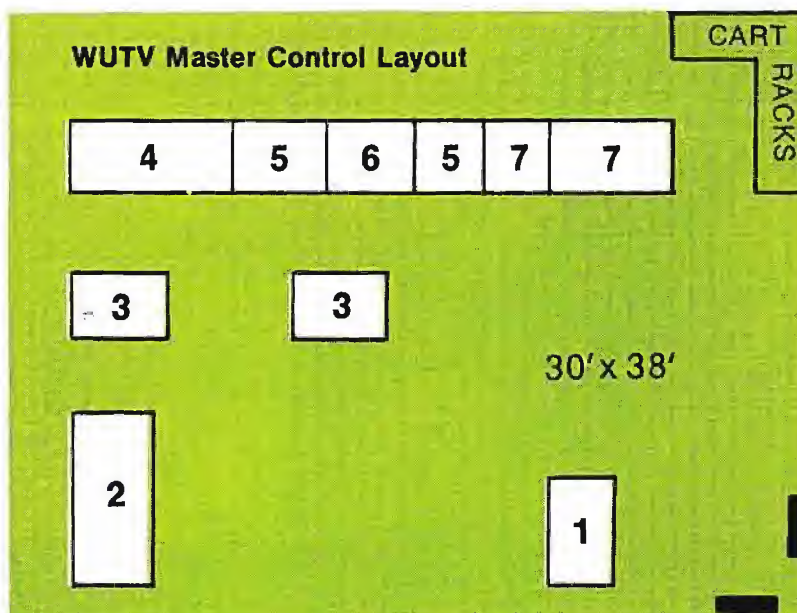
### Impressive TV Tape Grouping

Tape equipment is grouped along the back wall of Master Control and includes the TCR-100 and its TR-60; two more TR-60's, one of which is tied-in with a TEP editing unit; and a TR-70.

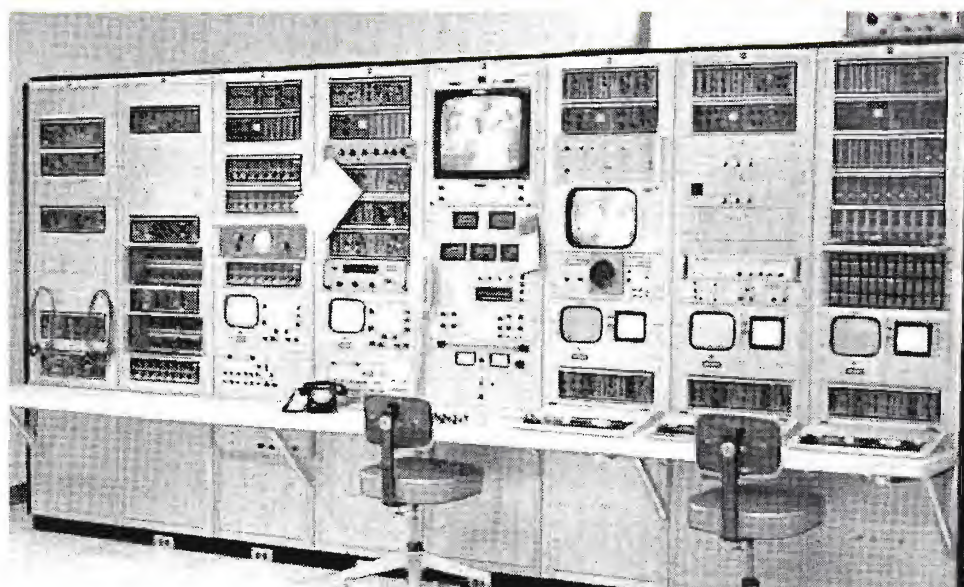
For editing sessions, the TR-70 machine is used for playback, while the TEP-TR-60 handles recording.

WUTV's TCR-100 was ordered as a part of the new station's initial equipment package—even before the product was available. A prototype "cart machine" was delivered in October 1971 and put into service immediately.

A part of Ch. 29's marketing strategy was to promote their production capability. This meant heavy demands on the two film islands and the VTR's. Mr. Cooper saw the "cart" as an answer—"the only logical way to go to relieve the strain on film and tape facilities".



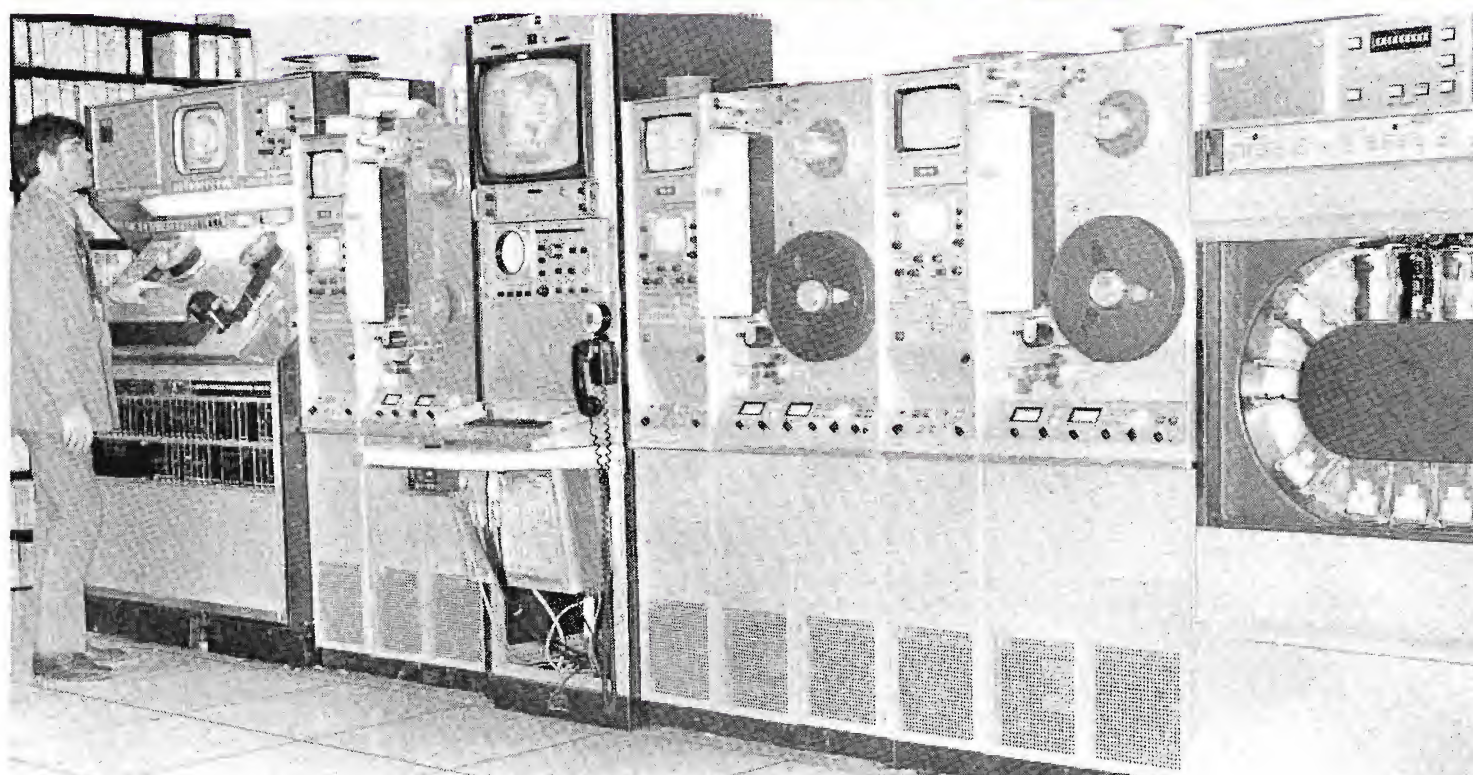
- 1 Master Control Switcher
- 2 8 racks: terminal, video, transmitter remote & test, camera controls, audio amplifiers, patch panel
- 3 TK-27 Film Islands
- 4 TR-70
- 5 TR-60
- 6 TEP
- 7 TCR-100 with TR-60



WUTV Master Control Room Layout.

Single row of racks houses terminal equipment, audio and video controls, camera shading controls and transmitter remote controls.

Compact, customized master control switcher is designed for one-man on-air operation.

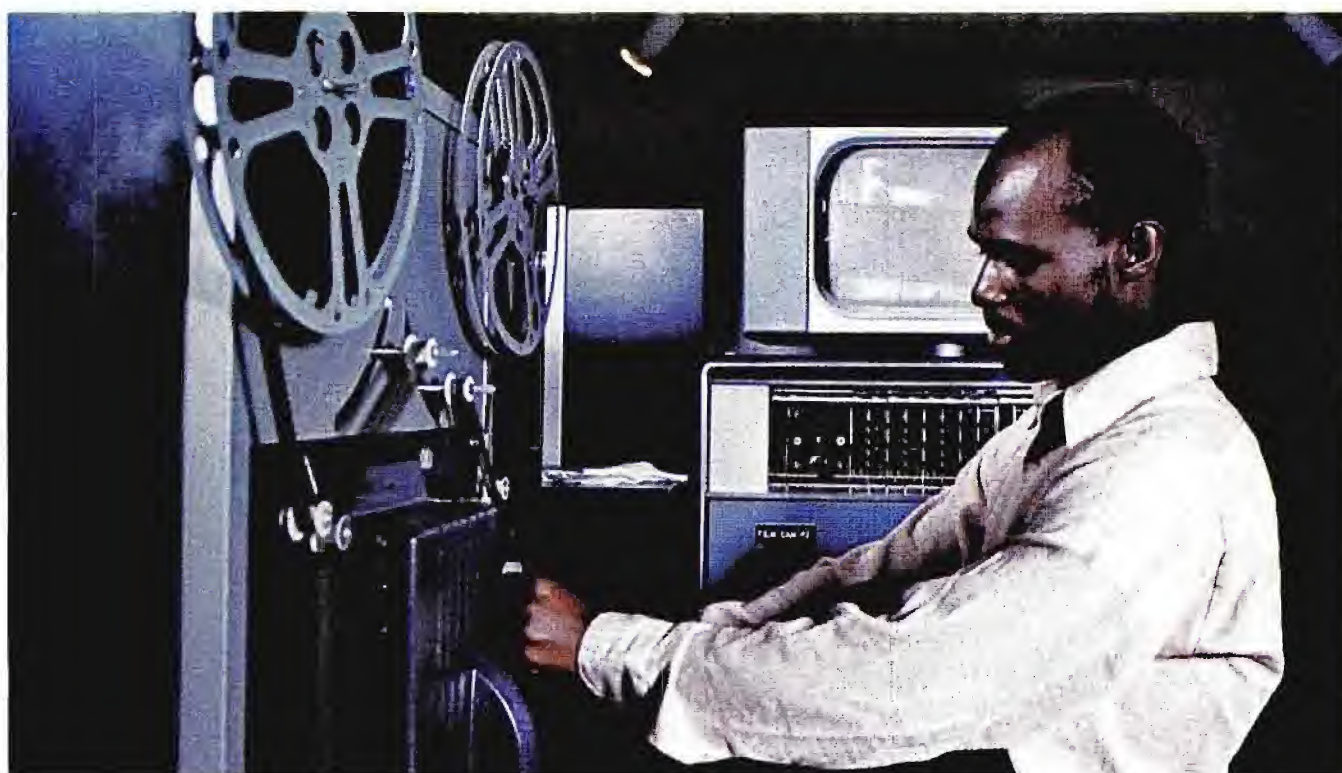


This wall of tape equipment from TR-70 to TCR-100 provides flexibility and capacity for production and programming.

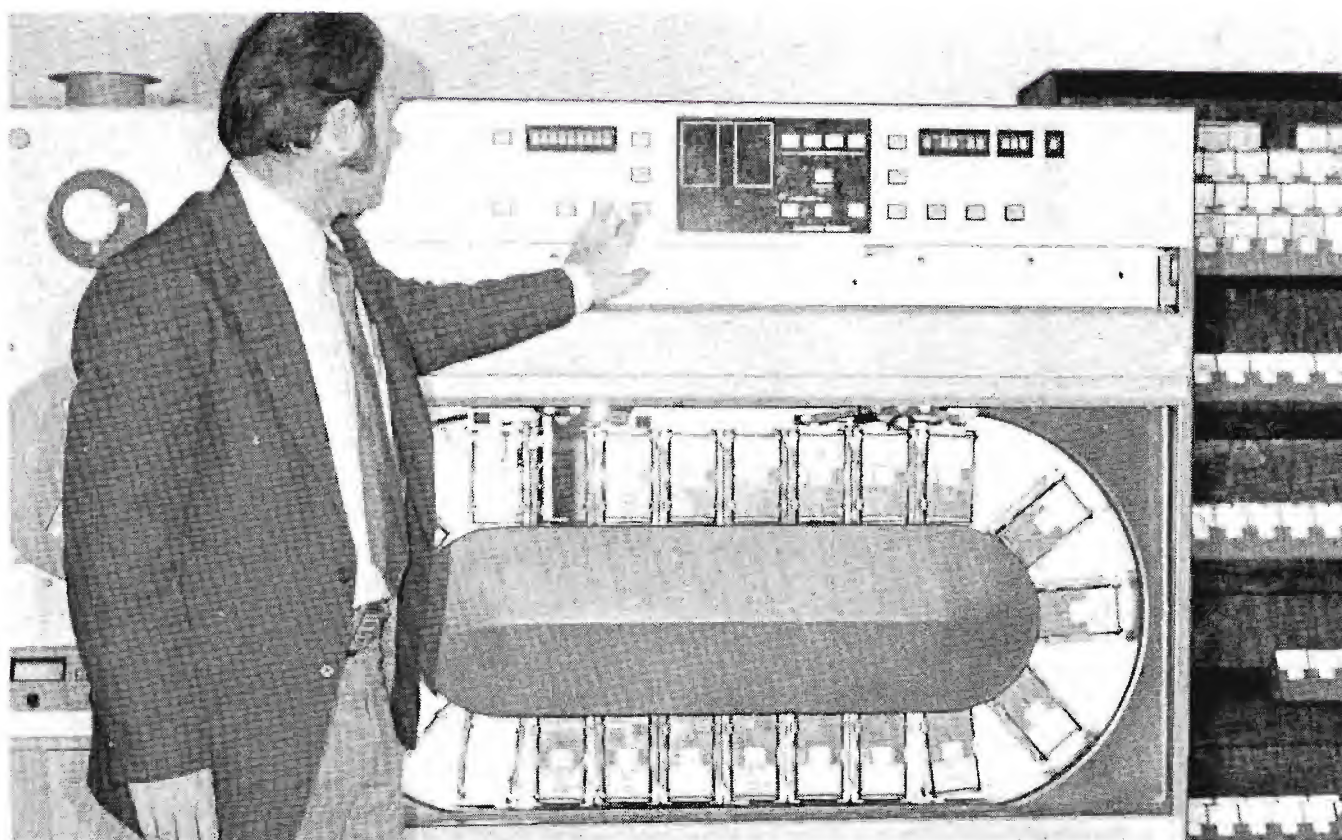




Quality performance comes natural to the TR-70 at WUTV, where it handles a full schedule of programming and production assignments.



Everett Standish loads film on one of TV-29's two TK-27 film islands.



At WUTV, the TCR-100 is mated with the TR-60, sharing electronics to provide extra tape handling flexibility.

### Plenty of "Cart" Action

The TCR quickly proved its value. The original unit had 49,000 plays on one transport and about 36,000 on the other when it was replaced—with no sign of head wear, according to Mr. Cooper. Just about everything that is used more than a couple of times on-air is converted to the "cart". This includes film and tape commercial spots, ID's, promo's, show openings and closings.

In the latter category, Mr. Cooper remarked that one of the news opening "carts" had gone through 3500 passes when it was retired from service and returned to RCA in Camden as a memento. The tape was still fine.

The "cart machine" at WUTV shares electronics with a TR-60, which turned out to be another happy choice, since this combination provides extra tape handling capability which is needed for handling production assignments.

### Special Numbering System for "Carts"

More than 500 "carts" are now recorded and used regularly. The Ch. 29 Engineering Department devised a numbering sequence which uses a 4-digit number to identify each "cart". Initially this system was developed as a ready means for locating the source for backup material in case of a failure in the TCR. However, it has proved so reliable that a minimum of backup material is now being retained.

- 1000 Series numbers are assigned to "carts" used for daily operations—movie openings and closings, the National Anthem sign off, news openings and closings, etc.
- 2000 Series identifies "carts" which are made from slides and an audio cartridge.
- 3000 designates film spots dubbed to the "cart".
- 4000 numbers are used for "carts" that are made up from reel-to-reel tape spots.
- 5000 Series are reserved for PSA's.
- 6000 identifies the "cart" as a program promo.

The "cart" file is housed in two station-designed cabinets which are located next to the TCR-100.

The "cart machine" is averaging 120 to 130 plays per day. Dubs are usually made between 9:30 and 11 A.M., with an average of 6 to 8 being done daily.

At WUTV, the engineer on duty is responsible for loading the TCR-100, and he has the option of loading for a break ahead, or filling all 22 slots. It turns out that there is no set pattern. Some engineers prefer to load from "break-to-break", while others like the full load.





TV-29's three TK-44 cameras deliver top quality color for commercial production and live programming.

#### TK-44's in Studio

At Ch. 29, Production is a separate activity, with one engineer assigned to assist with recording and editing. Production facilities include two studios, a control room and a small announce booth. Studio A, used for newscasts, panel shows and for graphics, is a modest 20' x 30'. Studio B is an ample 40' x 70', with Chroma Key, Kleigl lighting with a patch panel and remote dimmer. The entrance doorway is a generous size for moving in automobiles and other large pieces of equipment, products or props.

The studio equipment complement is headed by three TK-44's and a TS-51 System 14 Production Switcher, with double re-entry and chroma-key. The console has controls for the TK-44's the two film islands and four VTR's. There is also an audio console, cartridge and reel type audio tape recorders.

About the cameras, George Berk says, "The TK-44's are fantastic—the best around. They do everything claimed for them; are very stable and reliable. And they're easy to operate, which helps even less experienced camera operators to get good results."

#### Busy Production Schedule

With only a staff of four people and himself, there are few gaps in Paul Meyer's production schedule. Along with production for station programming and promos, there is a steady parade of commercial work to do. In a short time, WUTV has built a reputation for getting quality results on limited budgets. Mr. Meyer attributes much of this success to the fact that his staff is young, creative, and willing to try a "different" approach. And he is justly proud of the award won by his group in the 1972 New York State Broadcaster's competition in the local commercial category.

In producing commercials, Mr. Meyer often uses the movie-maker's technique—doing them in a number of short "takes" which are later edited and assembled to achieve the final result. By doing this, he says, he is able to create multiple effects, using previously taped "takes" as another camera for inserts, chroma key and supers. He recalls vividly one macaroni commercial in which 150 "takes" were used for a single spot.

For this technique, Mr. Meyer relies heavily on the TEP unit which permits frame-by-frame electronic editing. The TEP was a key element in the award-winning commercial, since it permitted achieving the animation effect at a fraction of the cost of doing it on film. With his technique, Mr. Meyer admits, 70 percent of production time is involved in editing tapes to achieve the desired effect.





Production Manager Paul Meyer—shown here at the controls of the WUTV production switcher—keeps actively involved in all facets of his operation.

TEP system is used extensively at WUTV for editing, animation and effects.

Artist Judy Meiro deftly scissors ink swatch stock to produce colorful, eye-catching ID's, promos and commercial slides for Ch. 29.

Ample-size studio enhances WUTV capability for commercial production.

Competence is recognized. WUTV was the recipient of the New York State Broadcaster's Association 1972 award for outstanding locally produced commercial.



Like most production people, Paul Meyer gives the TK-44 highest marks for color reproduction, stability and ease of operation. He makes frequent and effective use of the Chromacomp feature for "painting" to achieve the exact hue required.

Although he does not use the "cart machine" for production, he is delighted that it is on the scene. What it means to him, he says, is two VTR's available for production work.

#### Short on Staff; Long on Results

Presently, WUTV is on-air for 103 hours per week. Manning this air schedule and maintaining the technical facility involves a remarkably small staff. The Ch. 29 Engineering staff includes five engineers and two switcher operators, augmented by two "part-timers"—one engineer and a switcher. Even with his limited staff, Mr. Cooper says they find time to do some

design work—developing circuits and special wrinkles to improve station operation.

Commenting on the facility, Mr. Cooper said, "We felt that we needed the best equipment because with its full utilization and limited available manpower, we could not afford breakdowns."

The "fat-free" operation at WUTV is not limited to Engineering. Station personnel totals less than 50—from GM to janitor. Interestingly, nobody at the station talks about their frenetic pace or heavy workload—they just plunge in and get it done. Perhaps that's a part of their secret success formula.





This KOKH-TV planning session involves (left to right) Paul Ringler, General Manager; the author, Kaye Teall, Coordinator of Evening Programming; Gene Stockinger, Production Manager, and Richard Newton, Director of Operations.

## Moving With the Times, KOKH-TV



Students from Hefner Junior High School present a puppet drama on the weekly P. T. A. program.



by  
Kaye M. Teall,

Coordinator, Evening Programming

In 1956, when the Oklahoma City Public Schools first became involved in television, it was a frank experiment. How effective was the medium in instruction? What could it do and not do? What areas of education was it best suited for? There were no definitive answers; there were only theories, experimentation, and a lot of enthusiasm.

#### **First a VHF Channel**

Oklahoma City's entry into the ETV field came, in a sense, through the side door. Both the schools and the University of Oklahoma applied for the license for the educational channel in this area. Rather than become involved in hearings, there was an informal agreement between the two. The Oklahoma Legislature set up an Educational Television Authority which then applied for and received the license for Channel 13, KETA-TV, with the understanding that the Oklahoma City Public Schools would assume responsibility for daytime programming and the University for the nighttime schedule. The plan was successful, and instructional television came to Oklahoma City.

#### **Second Channel Added**

Two years later, Channel 25, which had been operated by a commercial company which had gone bankrupt, became available. Convinced by their experience with Channel 13 that television was an instructional tool of increasing value and viability, the schools applied for and received the license. Since that time, the schools have operated both channels during the daytime, offering a variety of instructional programs which serve not only the 109 schools in this system, but are available to approximately eighty percent of the school population in this state through Channel 13 and 25 in Oklahoma City and Channel 11 in Tulsa, which receives KETA's programming through a microwave relay.

Three members of Solar Productions, a Junior Achievement Company, tape a segment of their weekly series, *Student Spotlight*.



When TV operations began in 1956, a wing of one of the Oklahoma City high schools was converted into studios and a minimum of equipment moved in. At that point, the title "Broadcasting Center" represented the hopes of the school administration far more accurately than the reality of the operation. In 1958, some used equipment was acquired from the defunct Channel 25, along with the license.

#### **1970: Update to Color**

Very little was added between that date and 1970, when the station was completely

renovated and brought up to the state of the art. Three RCA TK-44A cameras were purchased, along with two TR-60 video tape recorders, two switchers, two color film chains, and color capability transmission components. The result was a first-class, full color station, as well equipped as any in the area. The new equipment has greatly increased the quality of local productions, making possible a wider variety of production techniques as well as a more efficient use of the engineering and production staffs' time.



### **Instructional TV for only \$4 per Student**

The improvements brought about by the upgrading of facilities are discernible at the receiving as well as the broadcasting end of the operation, since many of the schools now have color receivers. While in some kinds of programming, the primary value of color is in the heightened interest on the part of the children, in others, such as science and art, color is an important instructional tool in itself. An amazing fact of economics is that the whole daytime operation costs only about four dollars per child per year, less than the cost of a single text or resource book.

When the license application for Channel 25 was made, the purpose was simply to expand television's role in in-school instruction, and so it has operated only during school hours. There has been a growing feeling, however, that TV facilities and services should be extended to other parts of the community—when and where this could be done without diminishing the service to children. In addition, there was the acknowledgment that a public television channel belongs to the people and must serve the people as a whole.

### **Evening Adult Education**

The problem of financing an evening television curriculum was solved when Paul Ringler, General Manager of the Broadcasting Center obtained a grant from the Corporation for Public Broadcasting. Since ETV Ch. 13 was already carrying Public Broadcasting Services programs, there was no purpose served in duplicating their efforts.

The area not served by either the three local commercial stations or by Ch. 13 was adult education. This need was ideally matched to the expertise of the school system. The initial evening programming included a high school equivalency course; three business and industrial courses, and several special interest courses. Two of these—*Travelers' Spanish* and

*The Draw Man*—were locally produced. The expanded local production schedule includes *Bedtime Stories* directed to younger children, and a teen-age program called *Student Spotlight*, a show written and produced by a Junior Achievement company as their project. Several more productions are in planning, slated for inclusion in the summer-fall schedule.

### **Limited Staffing**

All of this has been—and is being—accomplished with a remarkably small staff of thirty-three people. In addition to Paul Ringler, the general manager, there is an engineering staff of eight, headed by John Gordon, Chief Engineer. There are coordinators for both daytime and evening programming, and five technical directors who also handle other duties in the operation of the station. The three-man art department serves all phases of the operation.

For several years, the trend has been toward a reduction of the teaching staff as more and more programs are obtained from other sources. At present, four different art programs at elementary school level are produced at the Center, along with fourth and fifth grade Spanish, Oklahoma History, Scientific Geography, and United States History. Only two of the teachers have single-program responsibility; all others do double duty. Paul Ringler, the general manager, does an elementary drawing program; Isis Tuel does Spanish programs for in-school use and for evening programming.

### **Administrative Support**

The primary problem facing KOKH-TV in evening programming is one of communication with the community. As the only UHF station in an area with four VHF stations, there is a real need to inform the public first that the station is on the air and second, that they can receive it. The station has a very strong signal, with a primary range of thirty-five miles.

A circumstance that has proved highly beneficial to the Broadcasting Center operation is that both the Superintendent of the Oklahoma City Public Schools, Dr. Bill Lillard, and the Assistant Superintendent of Instructional Media, Dr. Mervel Lunn, are former Center managers. Both are therefore knowledgeable about the operation and involved in and sympathetic to current Center policies and goals. Because of their background, they have been unusually effective in interpreting Center functions to the Board of Education. The administrative support given by them and by the Board is largely responsible for the continuing growth, both in facilities and in programming, of the Center.

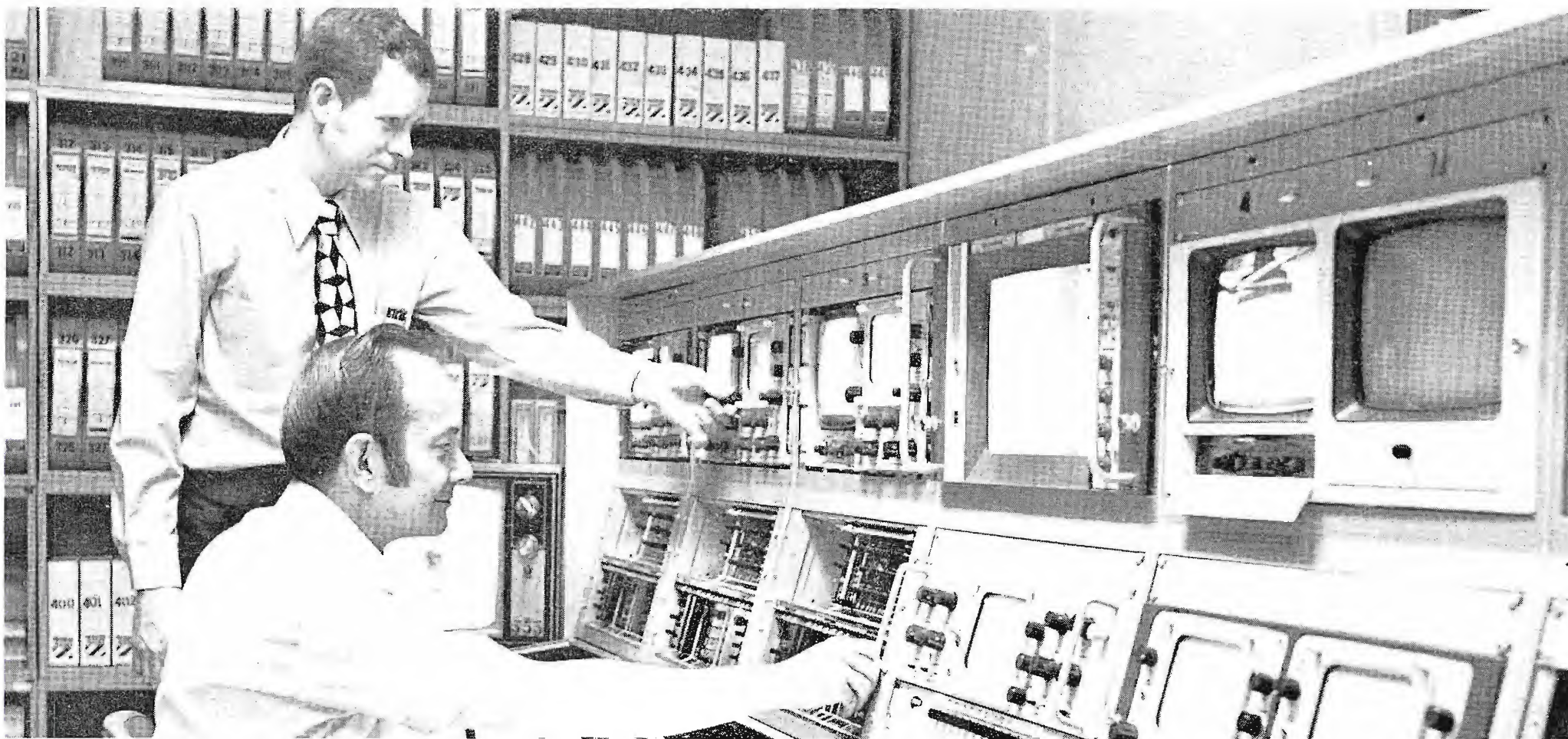
### **Ready Now for Tomorrow**

The first-class production facilities at the Center along with the new technological advances have opened up a potential for expansion that is expected to change the whole concept of instructional television in Oklahoma City. Plans are now being made to use off-air hours to broadcast programs which would then be video-taped on cassettes in the schools by a media aide. The whole Oklahoma History course, for example, could be broadcast, one lesson after another, and taped in the school, in just a few nights. The teacher would then have much more flexibility of utilization, and the Center's facilities, freed of rigid scheduling requirements, could be used to offer greater program variety and for more production. Thirty-six schools in the system are now equipped with video cassette recorders and more are on order.

One thing is certain: KOKH-TV is moving ahead with the times. In facilities, ideas, and personnel, it is ready for tomorrow.

Operating area layout for Oklahoma City Public Schools Broadcasting Center. Facilities are shared by Ch. 25 and Ch. 13.

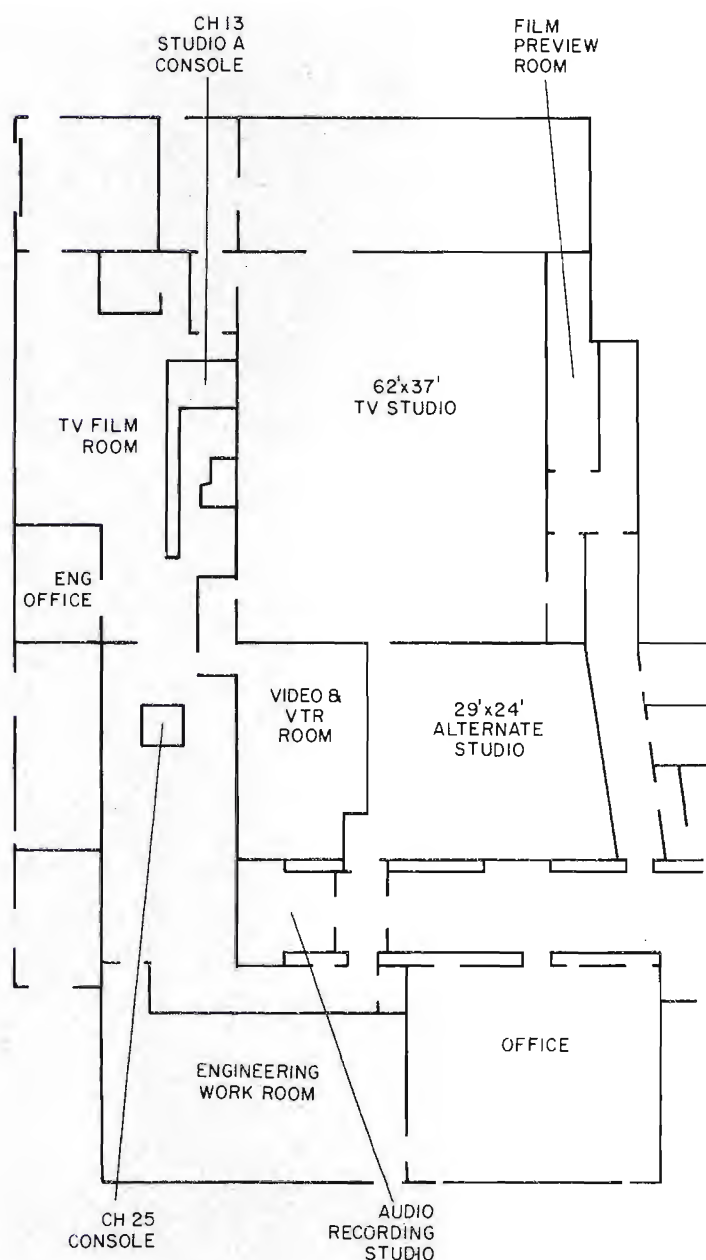
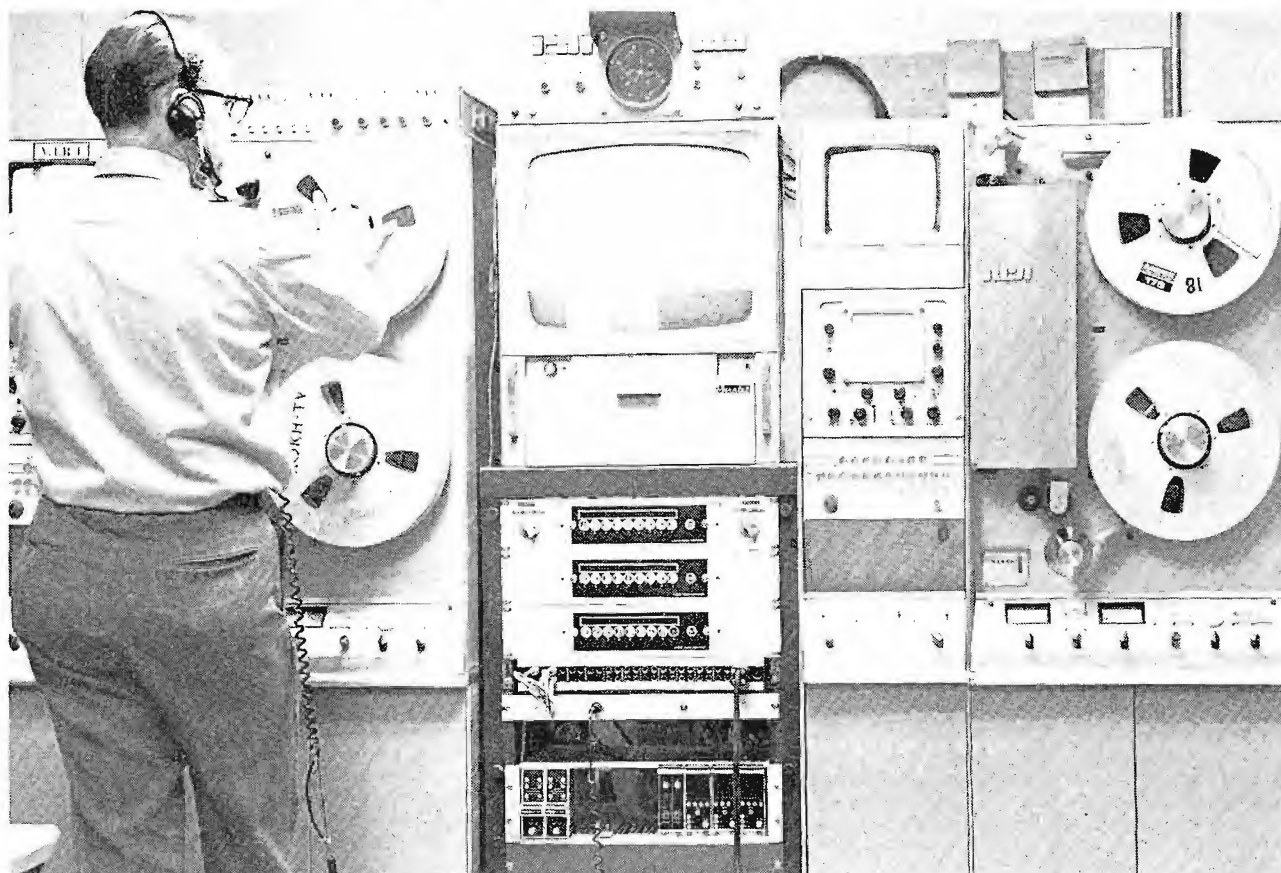




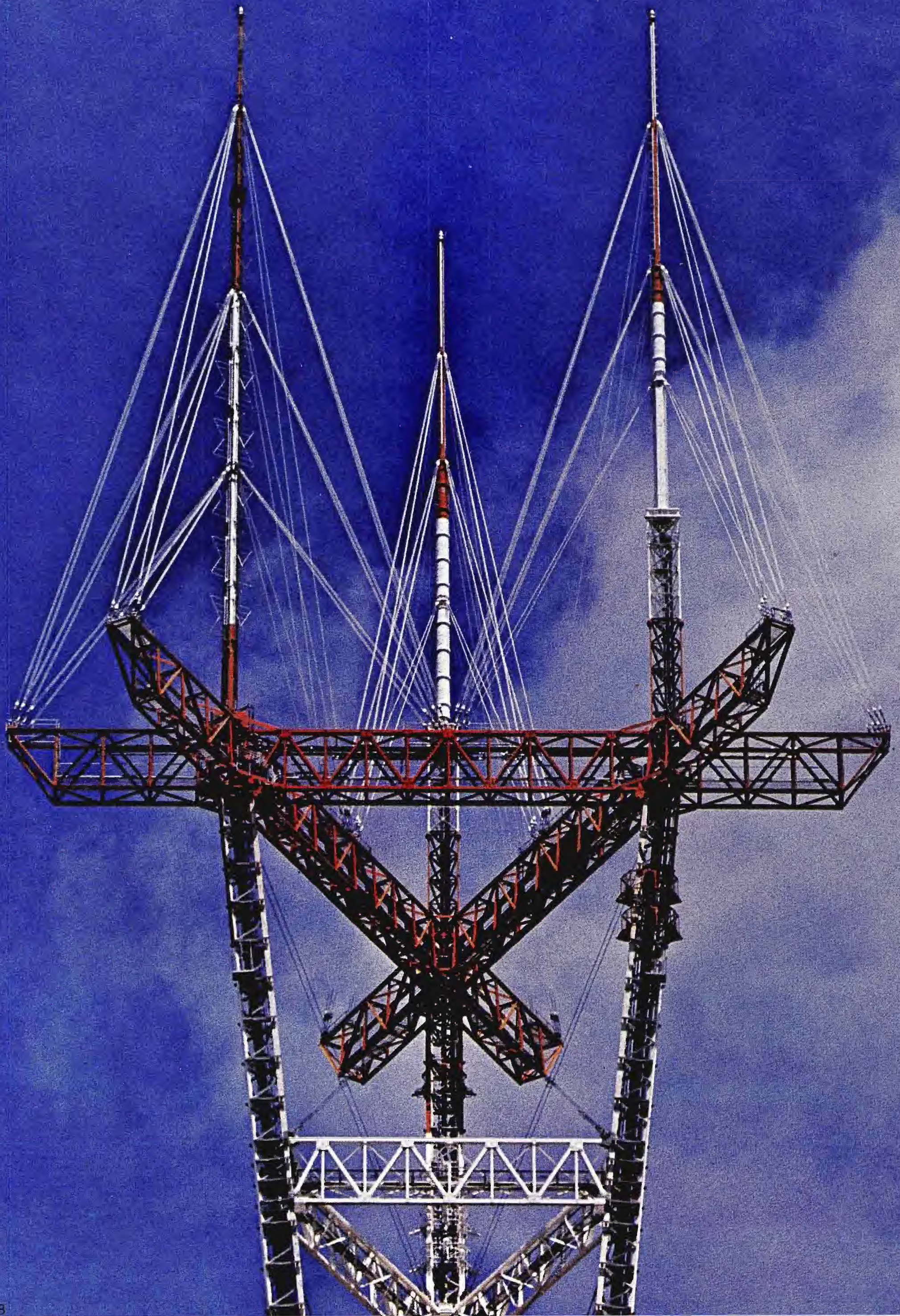
Chief Engineer John Gordon (standing) and Engineer Bob Freeman check the set up of the TK-44 cameras.

TS-51 Switcher, shown here with Director Don Noll, handles TV production requirements at KOKH-TV.

Tape complement includes two TR-60's.









# Bay Area TV Viewers Turn to Sutro Tower

For Which of You,  
Intending to Build a Tower,  
Sitteth Not Down First,  
and Counteth the Cost,  
Whether He Have  
Suffirient to Finish It?

St. Luke 14:28

## Prologue

Sutro Tower, Inc. completed the task it began. July 4, 1973 marked the culmination of 17 years of cooperative effort on the part of Bay Area television stations in striving to provide better service to viewers.

Independence Day is always special to Americans—a day of flags, parades, picnics, speeches, stirring band music, family gatherings, and monumental traffic jams.

For Bay Area television, July 4, 1973 marked a super-special day. This was THE DAY to "Turn to the Tower", the official opening of the Mt. Sutro tower antenna complex. It signalled a revolutionary change in TV reception throughout the Bay Area.

For the first time, all television signals radiated from the same point of origin—Mt. Sutro.

By aiming their antennas toward this friendly giant, TV viewers near and far can enjoy improved reception on all available UHF and VHF channels as well as FM radio stations on the Tower. For many it will mean a new freedom—of being able to change channels without also having to re-orient the TV antenna.

Sutro Tower is available to all licensed FM and TV broadcasters in the Bay Area. Present occupants of the Tower are:

Ch. 2—KTVU	Ch. 26—KTSF-TV
Ch. 4—KRON-TV	(future, not on air yet)
Ch. 5—KPIX-TV	
Ch. 7—KGO-TV	Ch. 32—KQEC
Ch. 9—KQED	Ch. 44—KBHK-TV

Four FM stations are also on the Tower:

KCBS-FM	KRON-FM
KFOG-FM	KSFX-FM

In addition, there is an array of equipment to provide ecological and scientific data, such as smog readings, and meteorological information. Various communications services are also utilizing the Tower.

The desirability of a common antenna site for Bay Area broadcasters was dictated by the unique topography of the region. It has been a known fact that television picture reception there has been the poorest of any metropolitan area in the United States. For a number of years, this area has been a magnet for industry and people. The result has been an explosive growth period, with a proliferation of industry, homes and population extending far down the Peninsula as well as to the North and East.

Aware of the need for improved service to their viewing audience, management of the Bay Area television stations began their cooperative planning sessions in September of 1956. In conjunction with the FAA and FCC, the problems of location, aviation flight patterns, land acquisition, and the reach of television signals from various locations were investigated.

These investigations, planning conferences and on-going hearings before the FAA, FCC and the San Francisco City Planning Commission extended over a period of ten years.

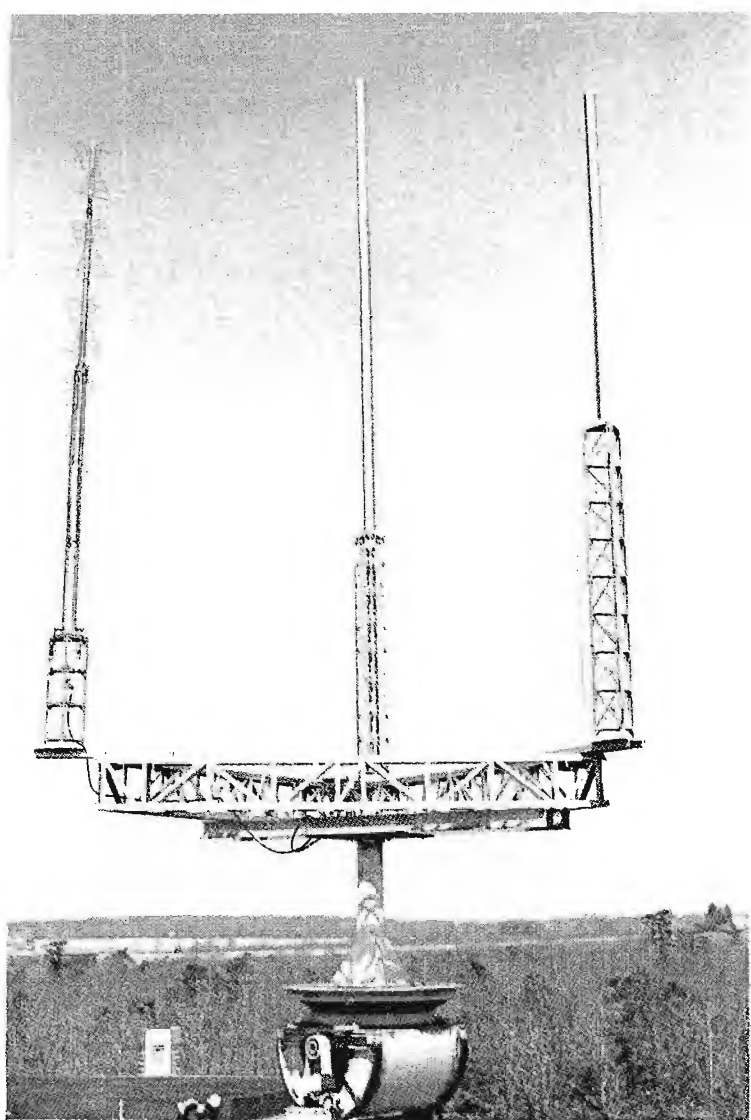
In 1966, after completion of hearings before all of the above groups regarding location of the tower, it was resolved that only one tower would be permissible and that Mt. Sutro was the only appropriate location in the Bay Area to meet all necessary criteria, including air travel safety.

Authorization for construction of the Mt. Sutro Tower came in March, 1966, when the San Francisco Planning Commission approved an application for a conditional use permit.

Substantial consideration has been given the project over the years, and a number of ideas were generated by committee members. With the official approval to proceed, work began almost immediately with manufacturers and all interested participants. Before construction could commence, it was necessary to develop an acceptable electronic design. Extensive preliminary work took place during this period.

PICTURE PERFECT. Impressive antenna array atop Sutro Tower serves as the common source for all Bay Area TV signals.





PRECISELY SCALED operating models of the TV antennas to be mounted on the Sutro Tower were constructed and tested at the RCA antenna engineering facility at Gibbsboro, N. J.

uration is unique and is one of the most complicated arrays ever developed for TV.

In 1968, Sutro Tower, Inc. was formed, owned jointly by: American Broadcasting Company, Inc. (KGO-TV); Westinghouse Broadcasting (KPIX-TV); Cox Broadcasting Corporation (KTVU), and Chronicle Broadcasting Company (KRON-TV). Prior to this formalized organization, architectural and electronic design plans were started. During the period from March 1966 to September 1970 there was extensive consultation by and between experts in all phases of development. A complete model of the entire structure was built and tested

Even before this, RCA antenna engineers had been involved in a study to determine the most practical and effective arrangement for an antenna array. The study covered a period of 18 months and consisted of two major phases:

The first phase was mathematical, using computer techniques to evaluate electrical interactions and the effects the antennas would have on each other in various configurations.

The second phase involved the construction of operating models precisely scaled to one-tenth the wavelength used by Bay Area stations. These models were used to validate the calculations and determine other characteristics that would not be made apparent by the mathematical tests.

From the various tests, antenna configurations and complex calculations, the three-stack antenna array evolved as the most effective mechanically and dynamically as well as electrically. The antenna config-



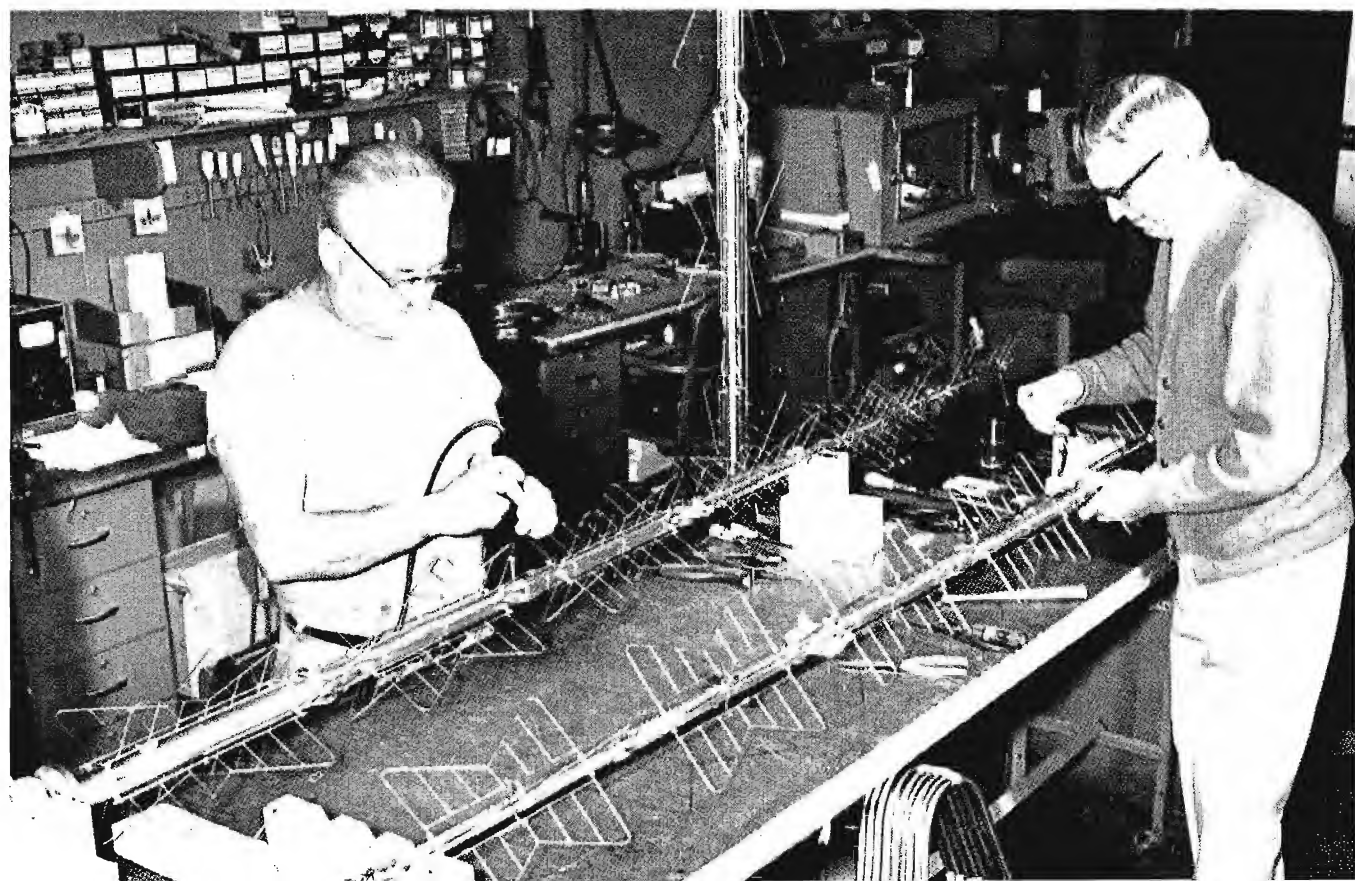
by one of the foremost structural engineering firms on the West Coast.

Bay Area stations initiated public filings to receive Federal Communications Commission permits approving location of their antennas on the Mt. Sutro Tower. Architects were commissioned to design a building to house the transmitters of the various stations locating on the site.

The next milestone date was September, 1970, when the San Francisco Planning Commission, in an open hearing, approved the construction plans of the Mt. Sutro Tower, transmitter building, landscaping and site development. This action was followed in December of 1970 when the San Francisco Building Permit Department granted a permit for the construction of the Tower. Three months later, the Department granted the permit for the transmitter building construction.

Excavation of land for the tower footings started in February of 1971, and construction of the transmitter building began in June.

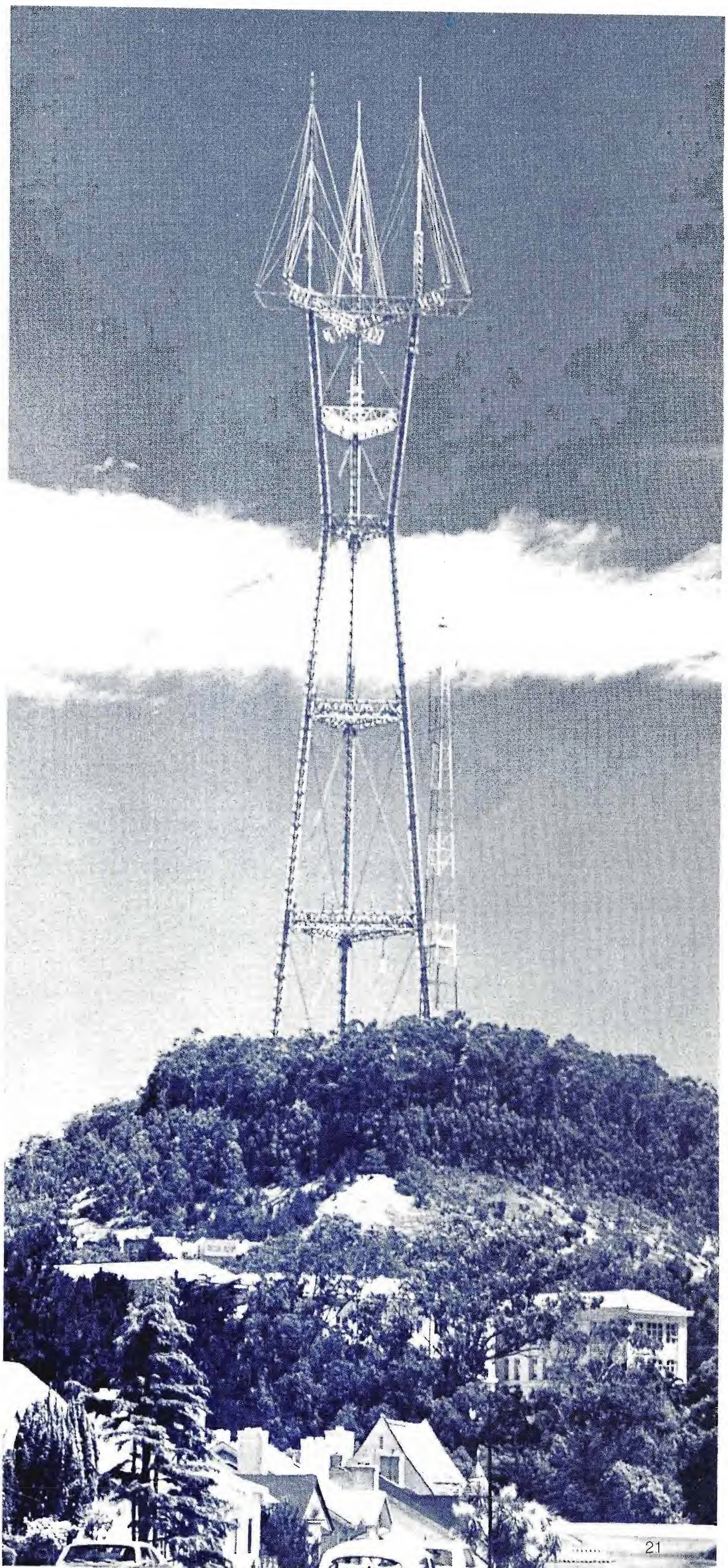
Construction of the Sutro Tower marked the beginning of the last major phase of a monumental project, extending over a time period of 17 years, with a final cost in excess of \$12,000,000—including tower structure, antennas, transmitter building and electronic equipment.



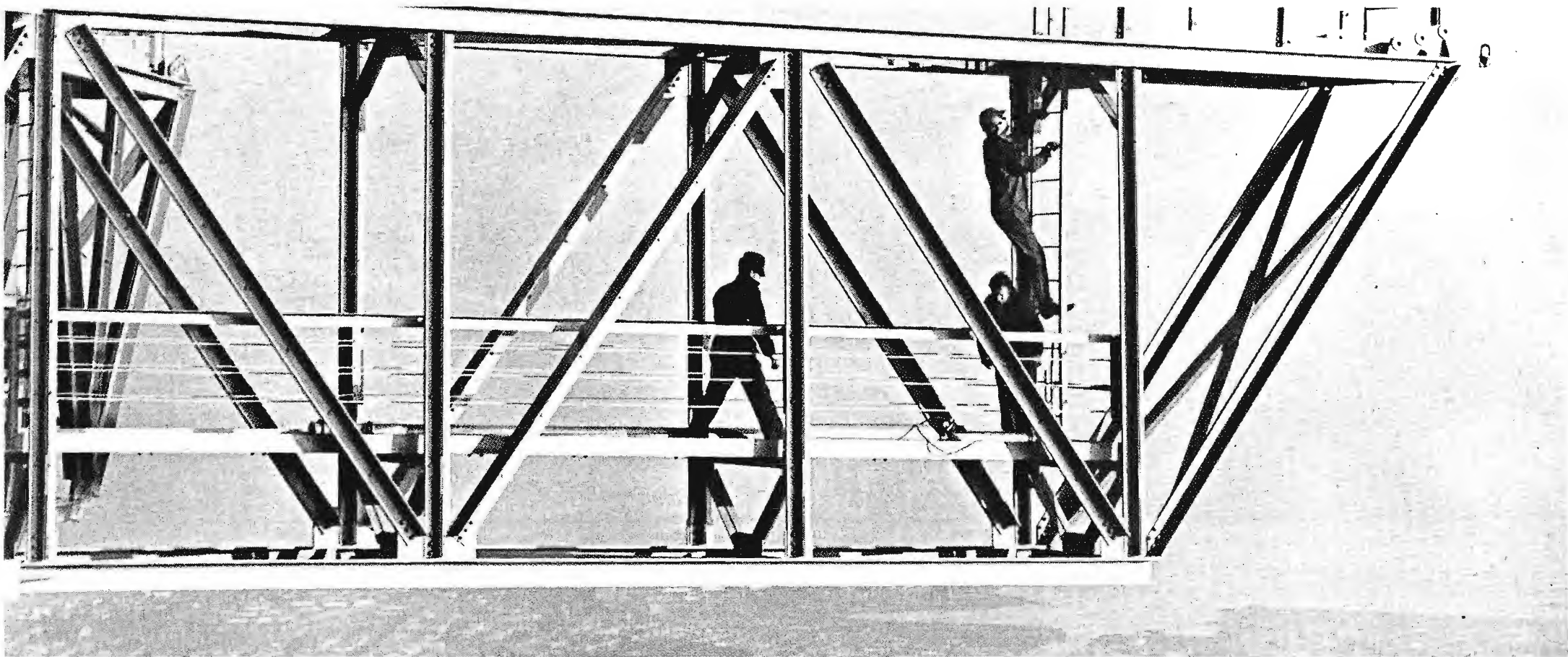


## Unusual Facts about the Sutro Tower

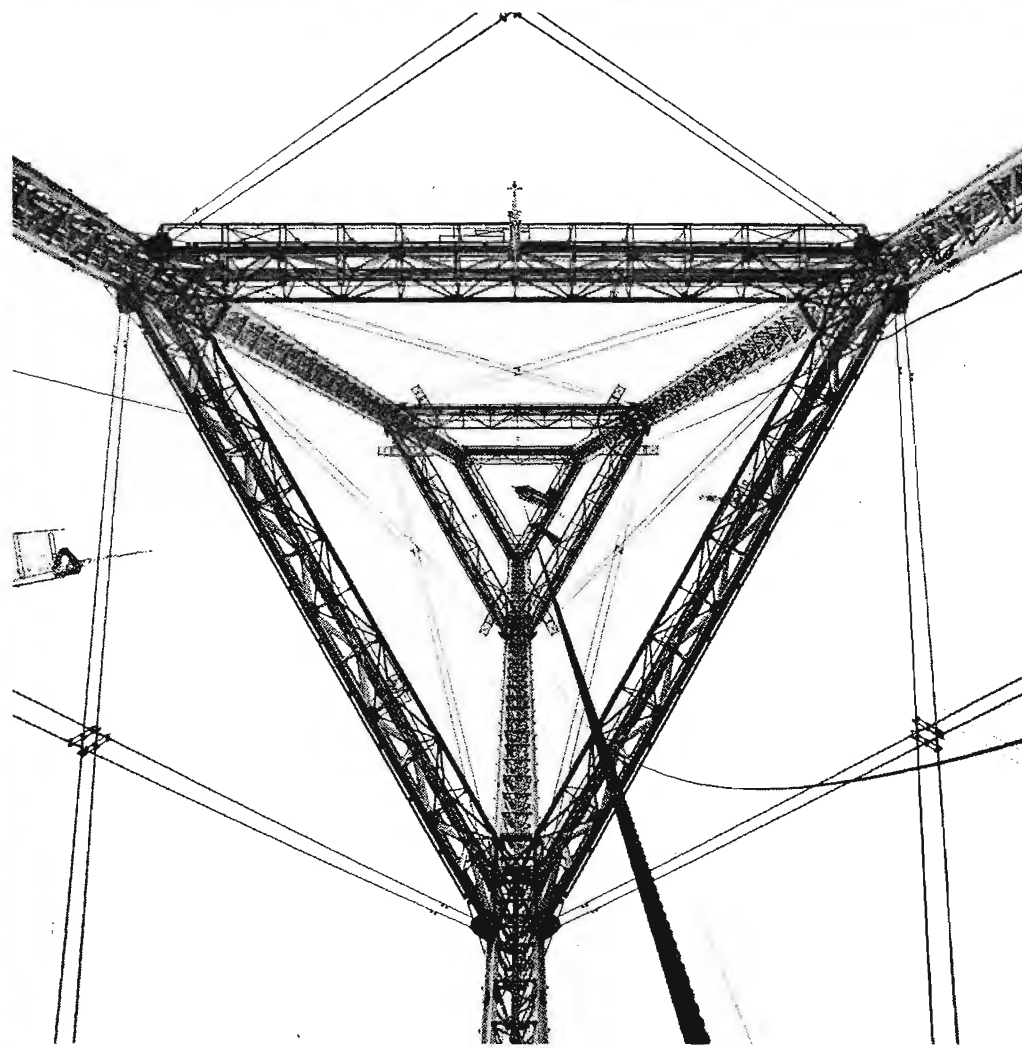
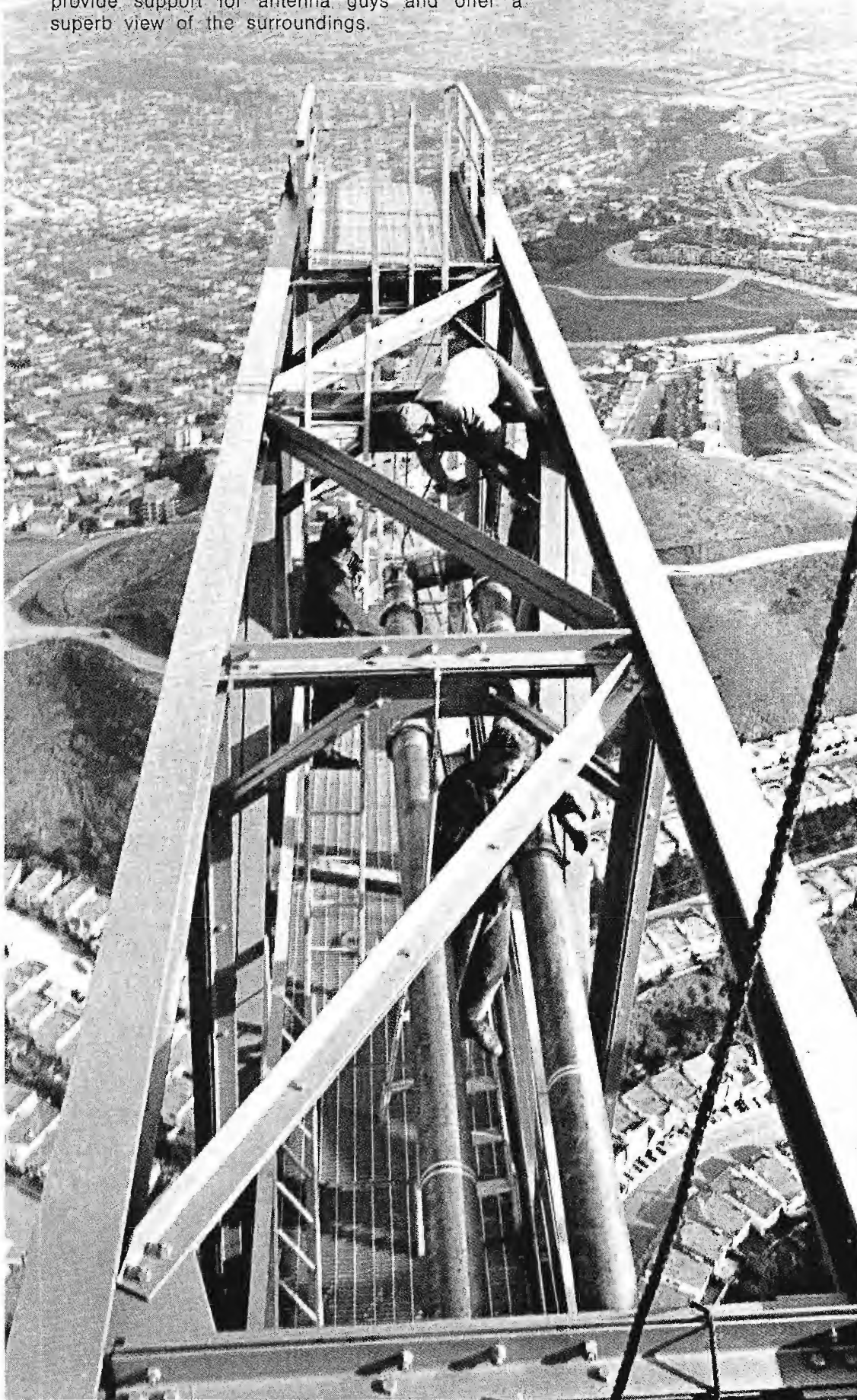
- It is 977 feet high.
- It is 1811 feet above seal level—the established agreement with the FAA.
- The tower itself is higher than San Francisco's former largest structure—the Bank of America Building.
- It comes within a few feet of equalling the height of the Eiffel Tower.
- Although it extends only 24 feet beneath the surface of the surrounding ground, there is **three** times the weight under the surface, due to concrete reinforcement.
- In a very large sense, the tower reinforces the mountain.
- Construction began February 23, 1971.
- The steel—all domestic (U.S. Steel & Bethlehem)—weighs 3,400,000 lbs. for the basic tower, and 200,000 lbs. for the antennas. Grand total: 3.6 million lbs.
- There are 25,000 feet of RF (radio frequency) transmission line—copper-coated coaxial.
- There are no rivets in the structure; it is all bolted and welded construction, thus unitizing it and making it structurally interdependent.
- The little elevator rises at a rather slow 100 feet per minute.







OUTRIGGER PLATFORMS at top level of tower provide support for antenna guys and offer a superb view of the surroundings.



UNUSUAL GEOMETRIC PATTERN is really a camera view of the tower looking straight up from the center of the base.

TOP TO BOTTOM. Photo taken from the top level looking down the tower shows the roof of the transmitter building at the base (left) and Sutro Mansion (right center).





FIRMLY BUT GENTLY gripped by the metal beak of the gin pole, the last antenna is eased into position.



### Tower Details

Sutro Tower is a three-legged, self-supporting, trussed structure. It was designed to accommodate, as much as possible, the aesthetic sensitivities of the community, providing a slender, functional profile. This effect was achieved in part by reducing the number of trusses used for supporting the legs to five. The top truss has outrigger projections which provide guy points for anchoring the antenna support guy lines.

At ground level, the tower legs form a 115 foot-sided triangle, and are imbedded in a massive concrete foundation system. As the legs rise, they are sloped inward at a 5° angle to the pinched "waist" truss at the 570 foot level. From this truss, the leg



TWO WAY RADIOS provided voice contact between crews aloft and ground during construction. Permanent intercom system was installed later.

slope reverses to 5° outward for the next 190 feet to the top truss.

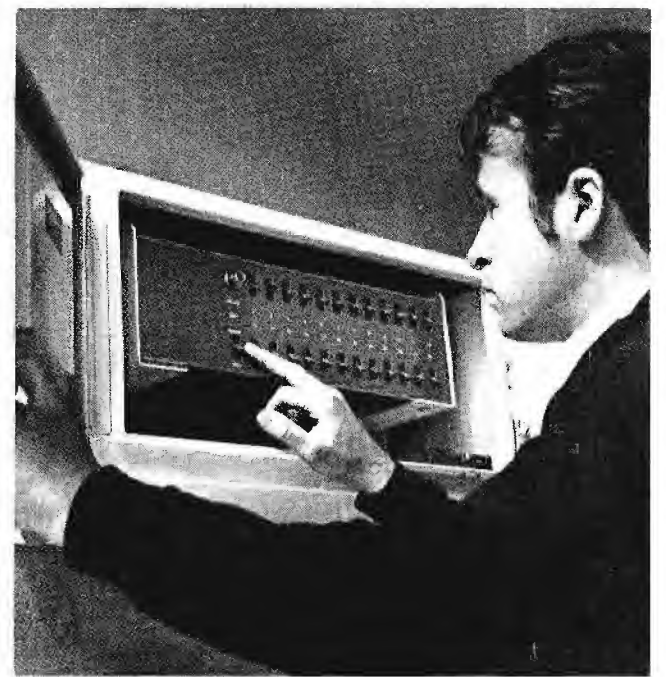
One leg of the tower is used to carry all transmission line for normal TV and FM operations. A second leg contains the standby transmission line runs. An elevator is installed in third (North) leg. To present a more attractive appearance, the legs and trusses up to the "waist" are covered in a metal sheathing. This also provides protection for the transmission line and elevator.

Overall height of the structure, including tower, antennas and lights is 977 feet. Ground level at the base is 834 feet above mean sea level.

UP, UP, AND AWAY. Antenna starts trip to the top of the tower.

### Logistics

Getting materials to the Mt. Sutro site was an order of business that required large measures of planning, fortitude, sweat and ingenuity. The leg and truss sections of the tower were pre-assembled at a fabrication yard in the city. Then the assembled sections, some as long as 60 feet had to be trucked to the top of the mountain. Access was limited to a narrow, winding and mostly unpaved road through a heavily wooded area. Further complicating matters was the requirement to preserve the trees and landscape. In delivering the longer sections, the trucks would wind up the hill as far as they could under their own power, and then were carefully winched up the last 600 feet.



The use of the downtown assembly yard permitted the construction crew to utilize all available time. When fog or wind, or occasionally bad weather stopped construction work on the tower itself, the crew was able to proceed with the pre-assembly work. When the tower reached a height of a few hundred feet above the ground, the fog became a problem, because the ground crews lost visual contact with the erectors working aloft.

Two-way radios eliminated this communications problem. Later, an intercom system was installed to facilitate voice contact with workers on the elevator or at the various truss levels.



### Antennas

The three antenna stacks which extend 210 feet above the uppermost truss on the tower consist of seven antennas at present, including Ch. 26 which is not yet on air. Three different types of antennas are employed:

*Superturnstile*—the standard in VHF television antennas for more than 20 years.

*Traveling Wave*—a highband VHF antenna that has demonstrated reliability and superior performance characteristics for a number of years.

*Polygon*—a comparatively new UHF antenna design particularly suited to stacking and directional use.

Stack A is made up of two six-section Superturnstiles: one for Ch. 2 (KTVU) and the second one diplexed, serving both Ch. 4 (KRON-TV) and Ch. 5 (KPIX-TV). These Superturnstiles have an emergency feature whereby each may be divided into two separate portions with independent transmission lines so that either or both portions may be switched into use at the station. An absorption filter provides isolation between the two stations using the single antenna.

Stacks B and C have the same configuration, each including UHF and VHF antennas. Stack B includes a Traveling Wave antenna for Ch. 7 (KGO-TV) and a Polygon for Ch. 44 (KBHK-TV). Antennas on stack C are a Traveling Wave for Ch. 9 (KQED-TV) and Polygons for Ch. 32 (KQEC-TV) and

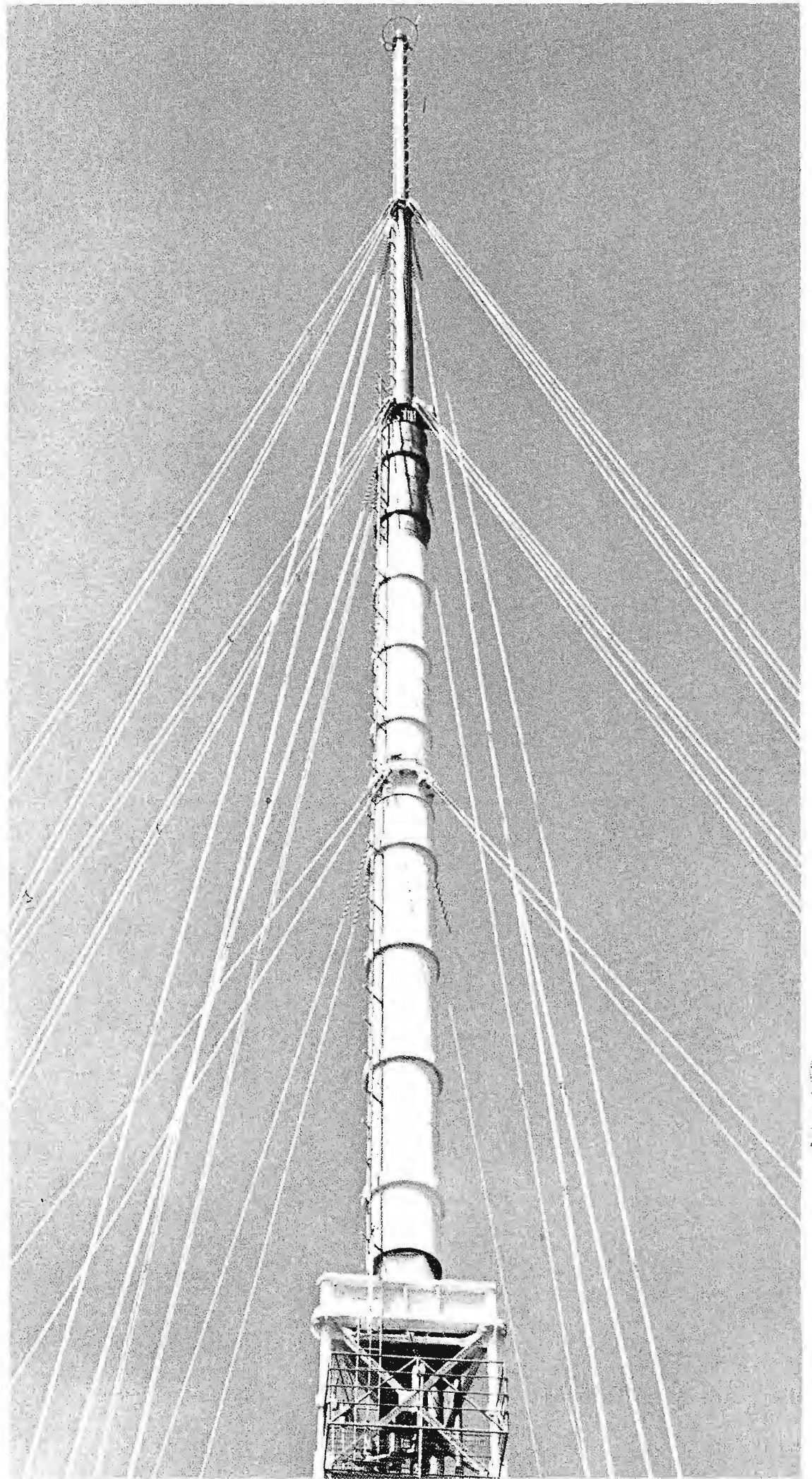
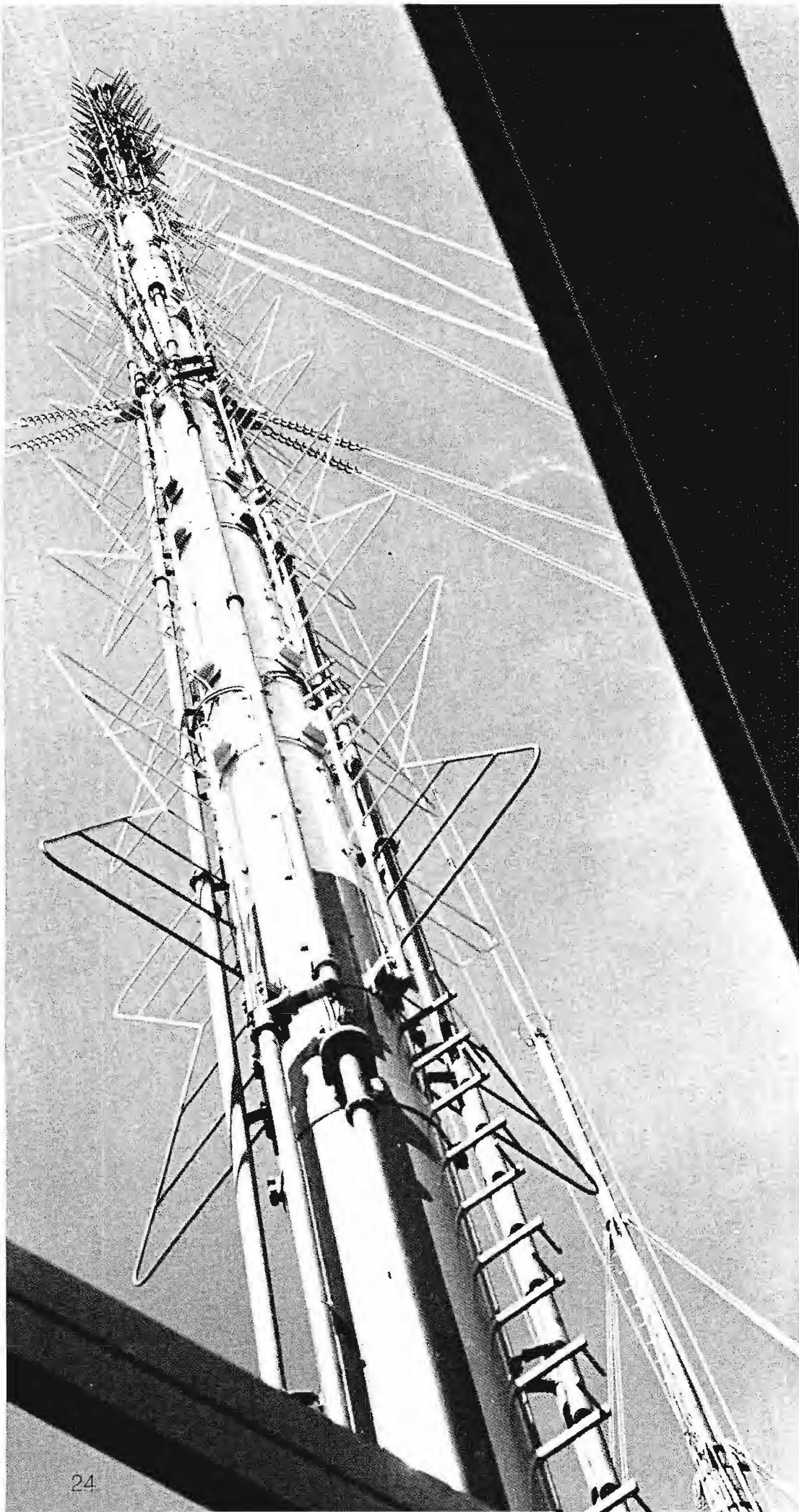
for Ch. 26 (KTSF-TV) which is scheduled to go on air at a future date.

The horizontal directional pattern for the Polygon antennas is tailored to the Bay Area. It is in the form of a cardioid, with the suppressed portion toward the Pacific Ocean three miles to the west.

### Standby TV Antennas

Standby antennas for five stations are mounted on the tower at the 170-foot level. These antennas are fed by transmission lines running back to the transmitter building wall, and can be put into operation by switching from the main facility at that point. Sectionalizing of the lines of the two Superturnstiles into upper and lower portions provides additional standby facilities for Channels 2, 4 and 5.

VIEW FROM THE TOP, looking up at Sutro Tower antenna stacks.





### FM Antennas

Four FM antennas are presently located on the tower. Two of these—KFOG-FM and KRON-FM—employ a new panel antenna recently developed by RCA. This antenna, Model BFB, provides excellent horizontal pattern circularity. And, since the panels are mounted around the outside of the tower, signals are not obstructed.

### Transmission Line

Lost in the majesty of the antenna and tower structure of Mt. Sutro is the lowly transmission line—the ordinary looking “plumbing” that carries the signal to the antenna.

Yet the transmission lines—design, layout, assembly and installation—comprise a large portion of the RCA system contract. It was the major task for the project team.

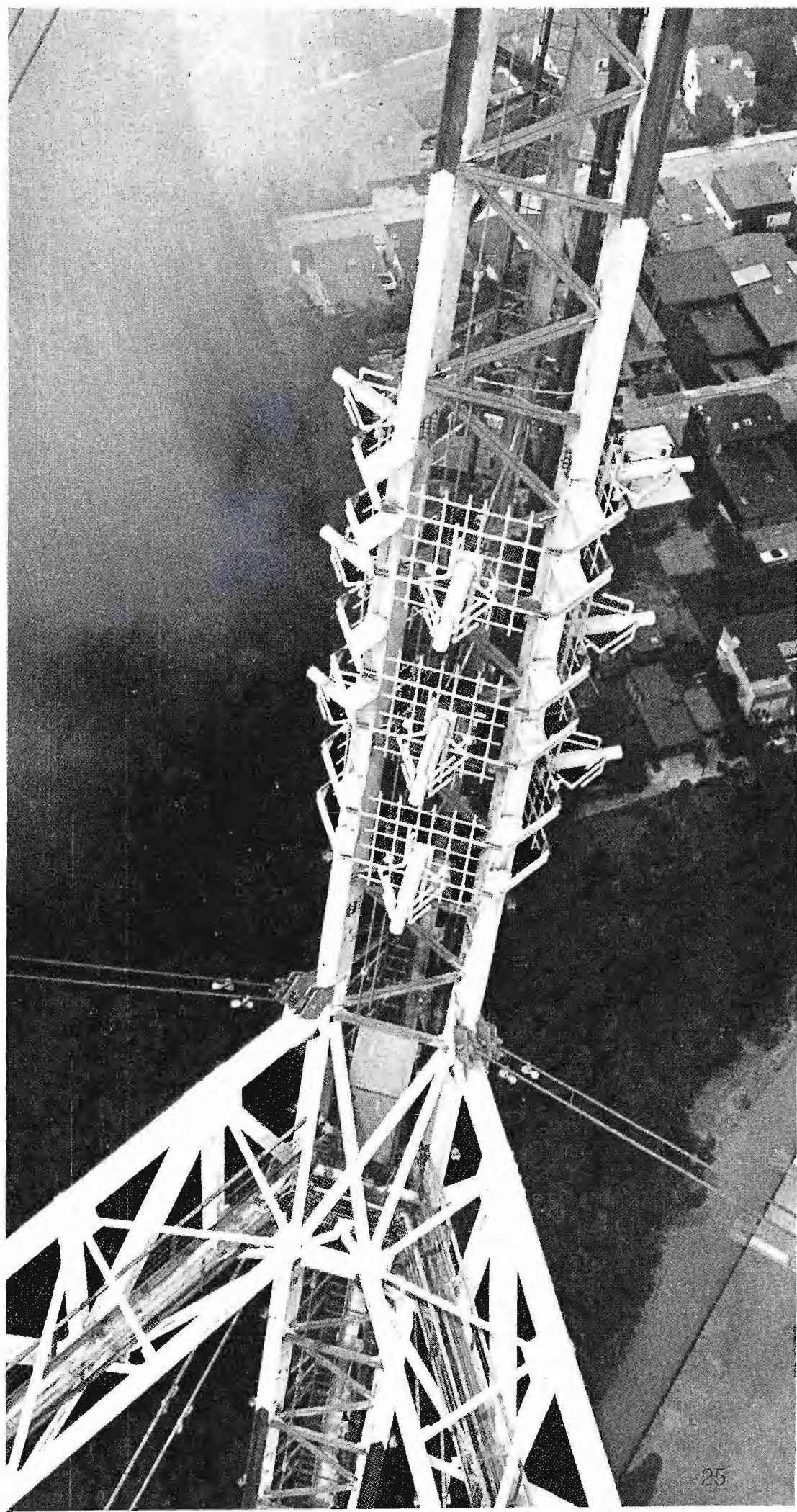
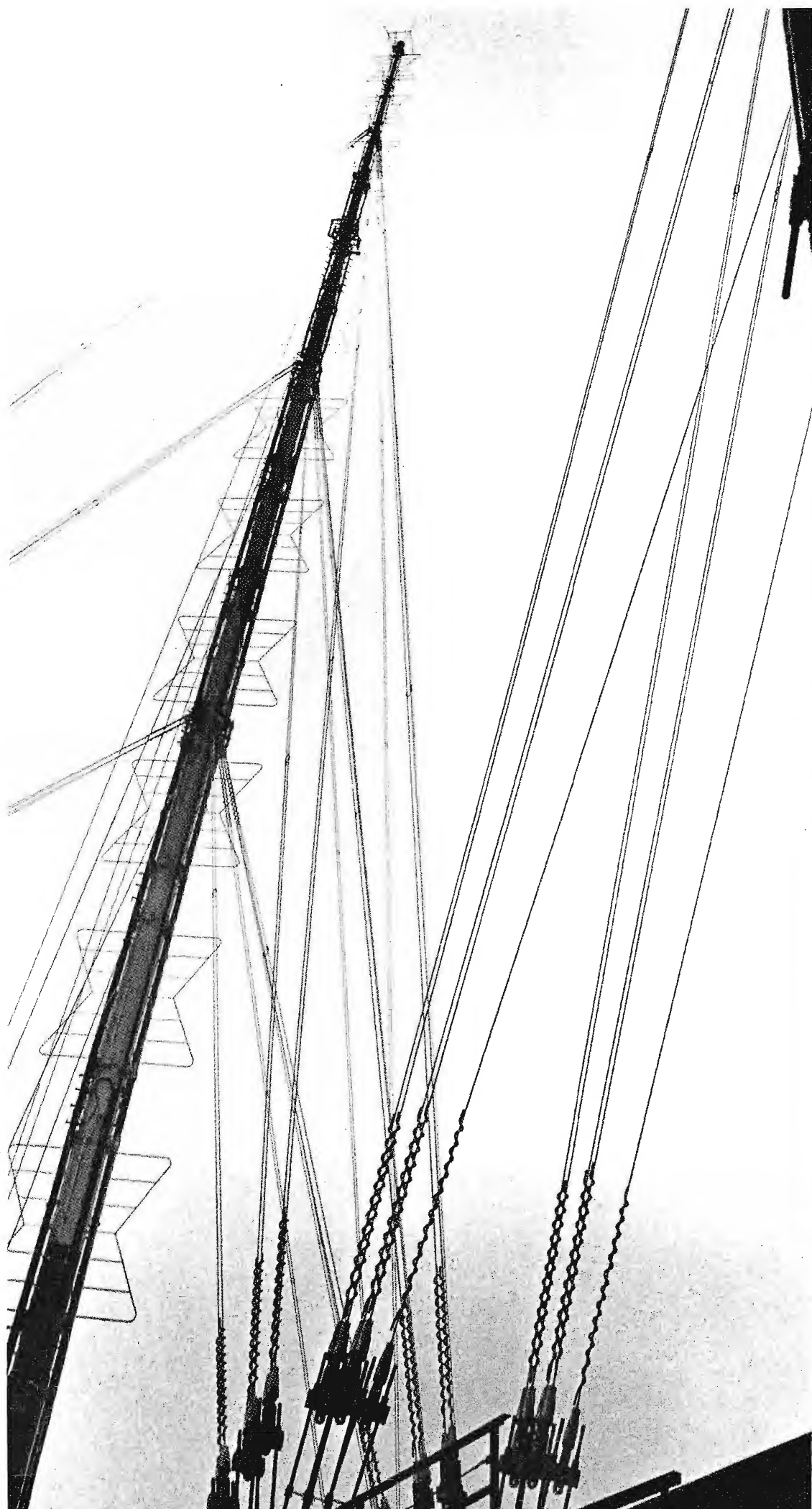
MAST AND GUY WIRES give this antenna the appearance of a sailing ship riding at anchor.

STANDBY ANTENNA hangs but like from the first truss level of the tower.

assigned to Sutro. Thousands of feet of line had to be painstakingly checked on-site before and after installation (even though much of it had been pre-cut to dimension and tested by RCA prior to cross-country shipment). It was carefully tested for proper VSWR, impedance match and compliance to pre-established performance specifications.

The main transmission lines range in size from  $3\frac{1}{8}$  to  $8\text{-}3/16$  inches in diameter. Because of the slope of the tower legs (inward from the base and outward from the “waist”) the lines could not be installed vertically as is the usual practice, but follow the slope of the leg. This required specially engineered support hangers instead of the conventional suspension method for vertical lines.

ODD-LOOKING GRIDS wrapped around tower leg are actually layers of a new design FM panel antenna.

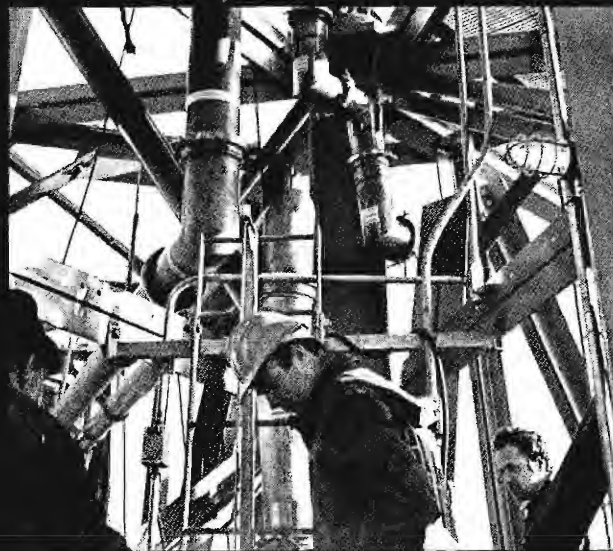
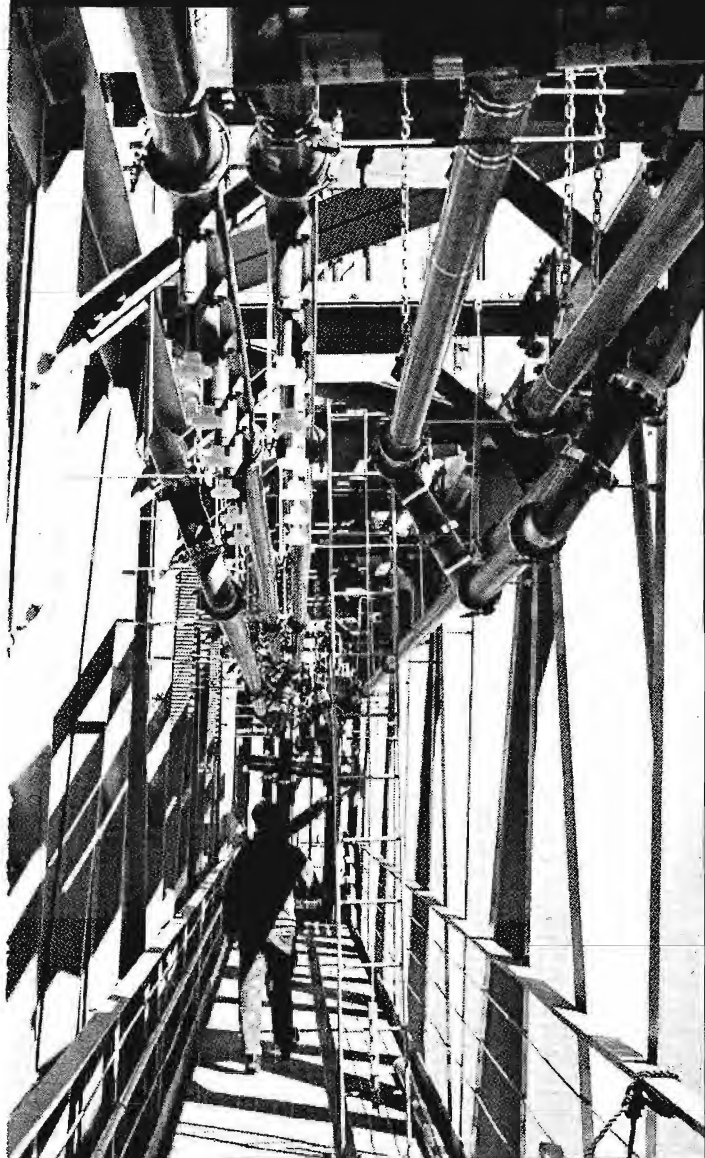




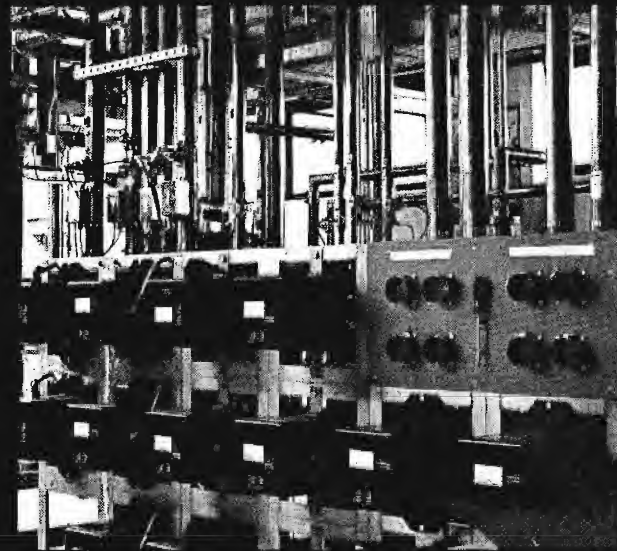


DOWN THE BARREL. Main transmission lines leave transmitter building for long run to the top of the tower.

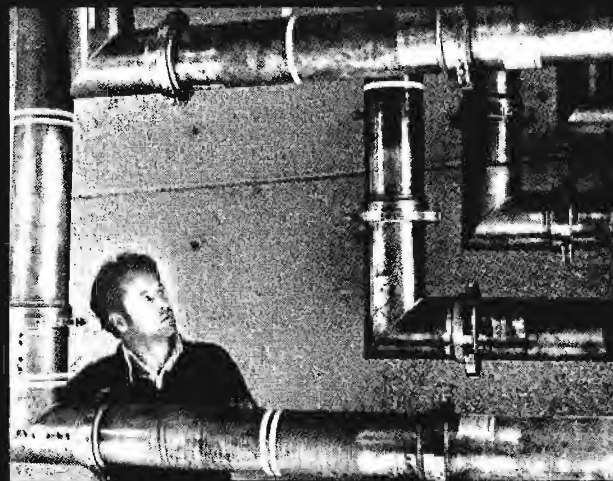




MAZE OF PIPES AND STEELWORK shown in this construction photo is indicative of the complexity of the system.



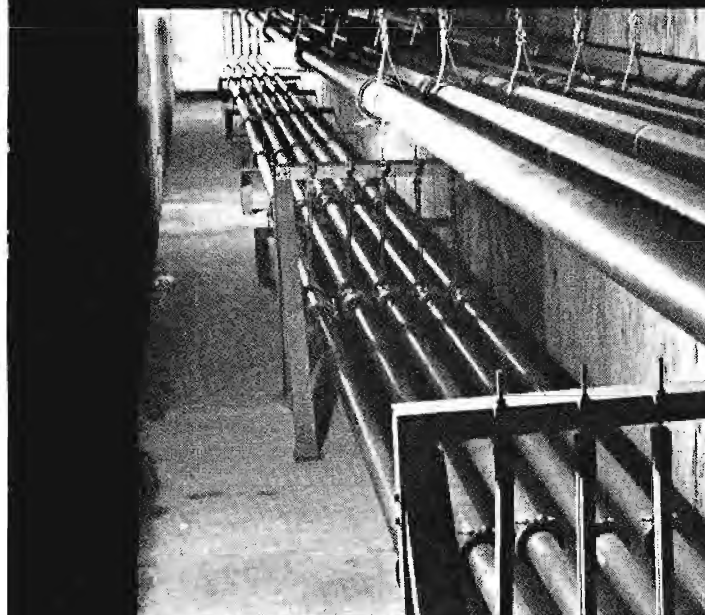
PLUMBER'S NIGHTMARE OR DREAM? Transmission line for one transmitter room—part of the 25,000 feet of line used in the entire system.



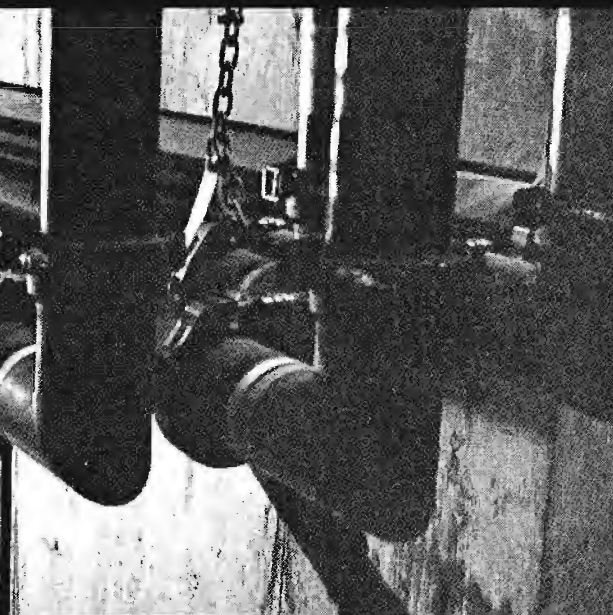
ELBOWS AND BENDS were a continuing concern for RCA engineer Ernie Baker during installation of transmission line.



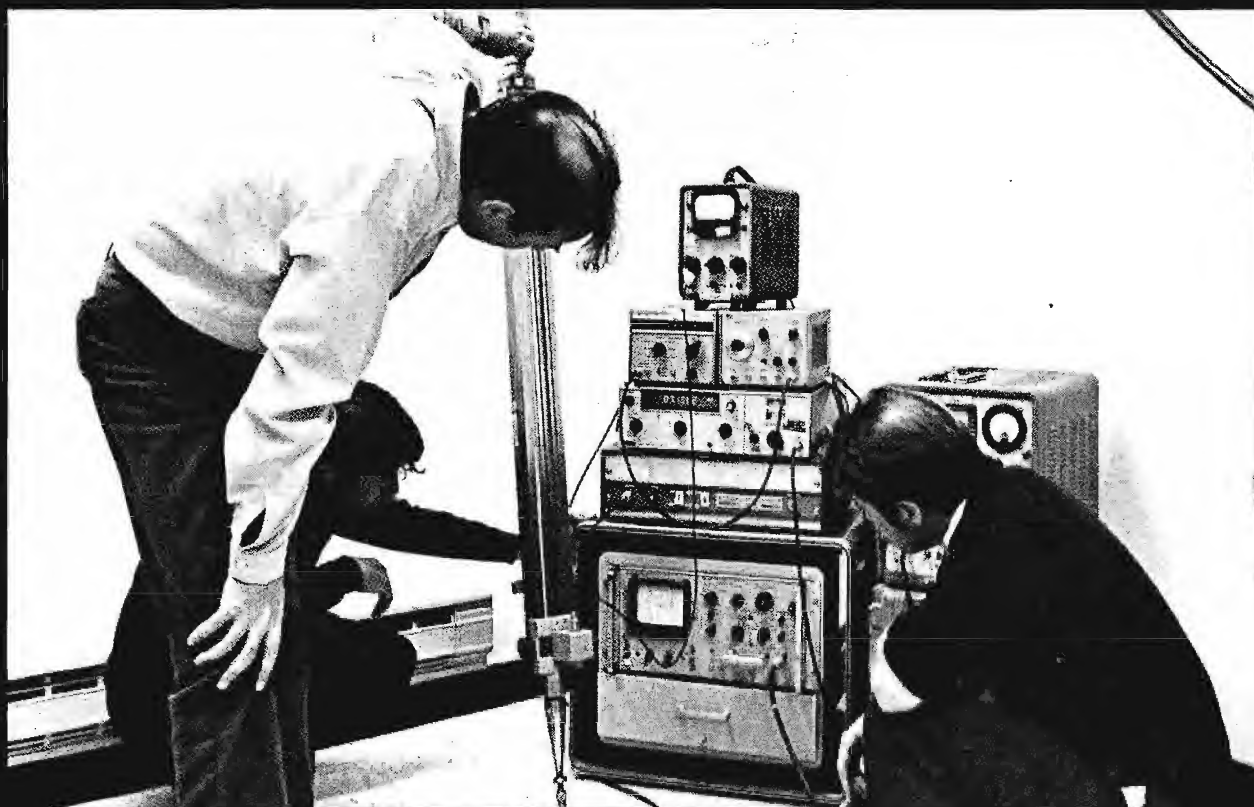
STANDBY TRANSMISSION LINE runs are contained in one tower leg; main lines in the second, and an elevator in the third.



NEATLY ARRANGED AND CAREFULLY SUSPENDED, transmission lines are routed to assigned transmitter rooms.



RCA ENGINEER JOHN BARBOUR tightens a connection on one of the upper lines.



MEASURING AND TESTING climaxed the installation of the transmission line system.



### Transmitter Building

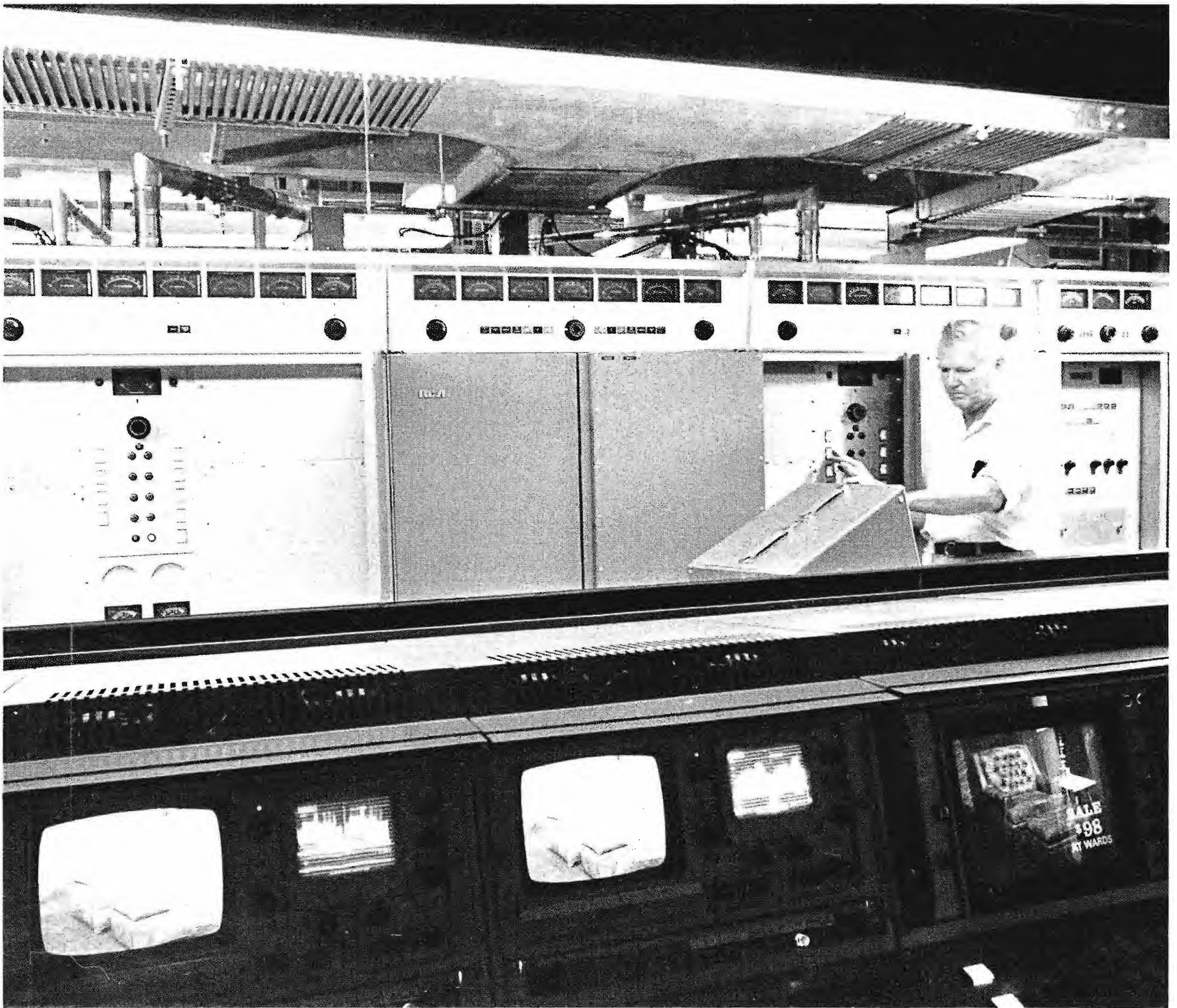
Like the tower it helps support, the Mt. Sutro transmitter building is a unique design. It is a massive concrete structure encircling the tower leg which carries the main transmission lines. A functional three-level structure, this building houses transmitter facilities for all stations on Mt. Sutro, with space provided to accommodate future occupants.

FM transmitter facilities are located on the first floor (ground level), while the second and third floors house the television transmitter rooms.

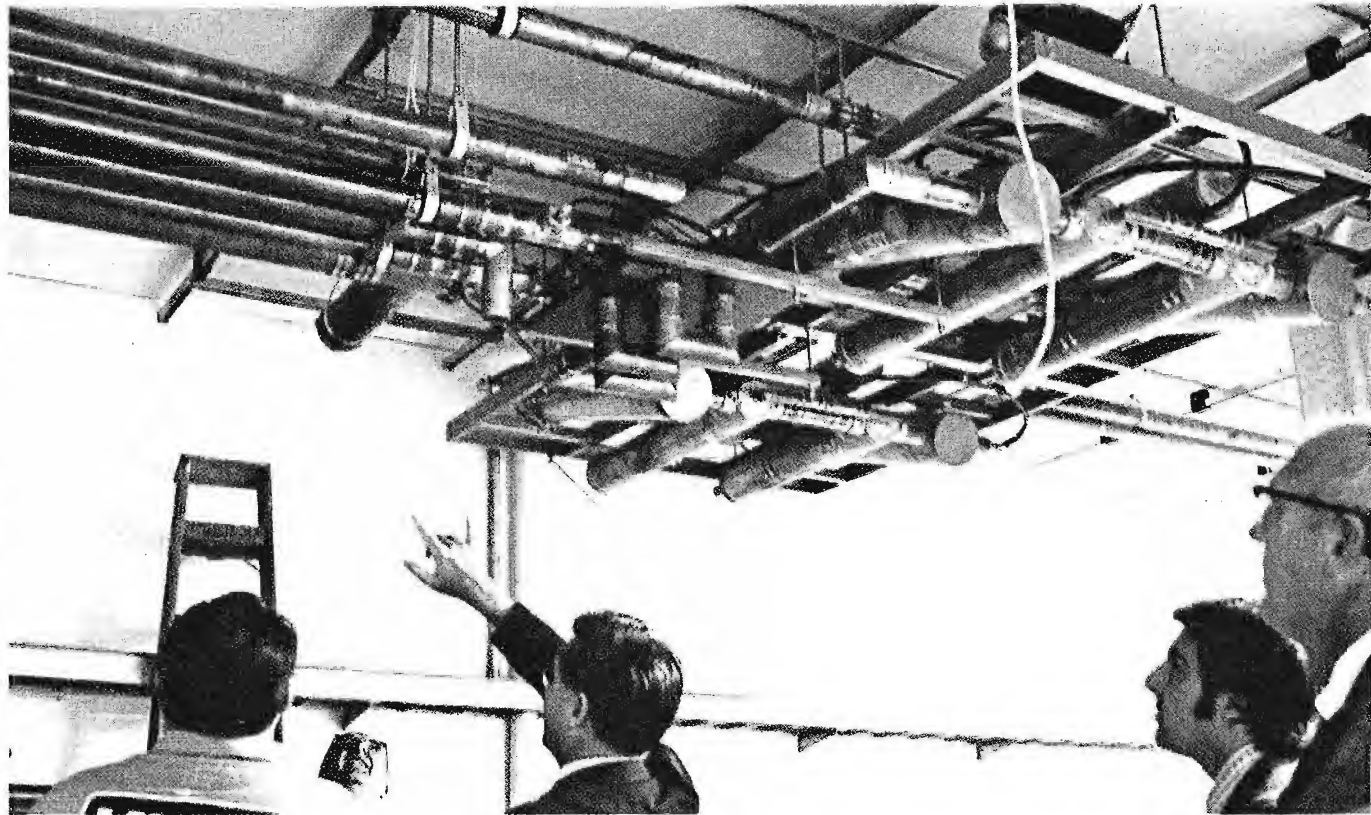
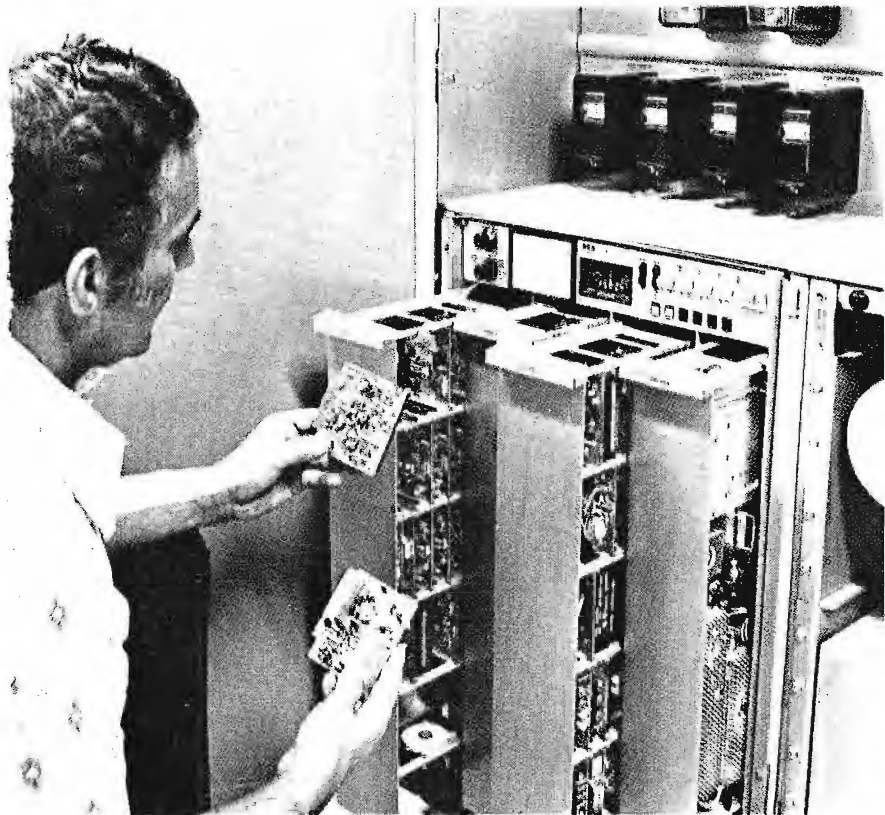
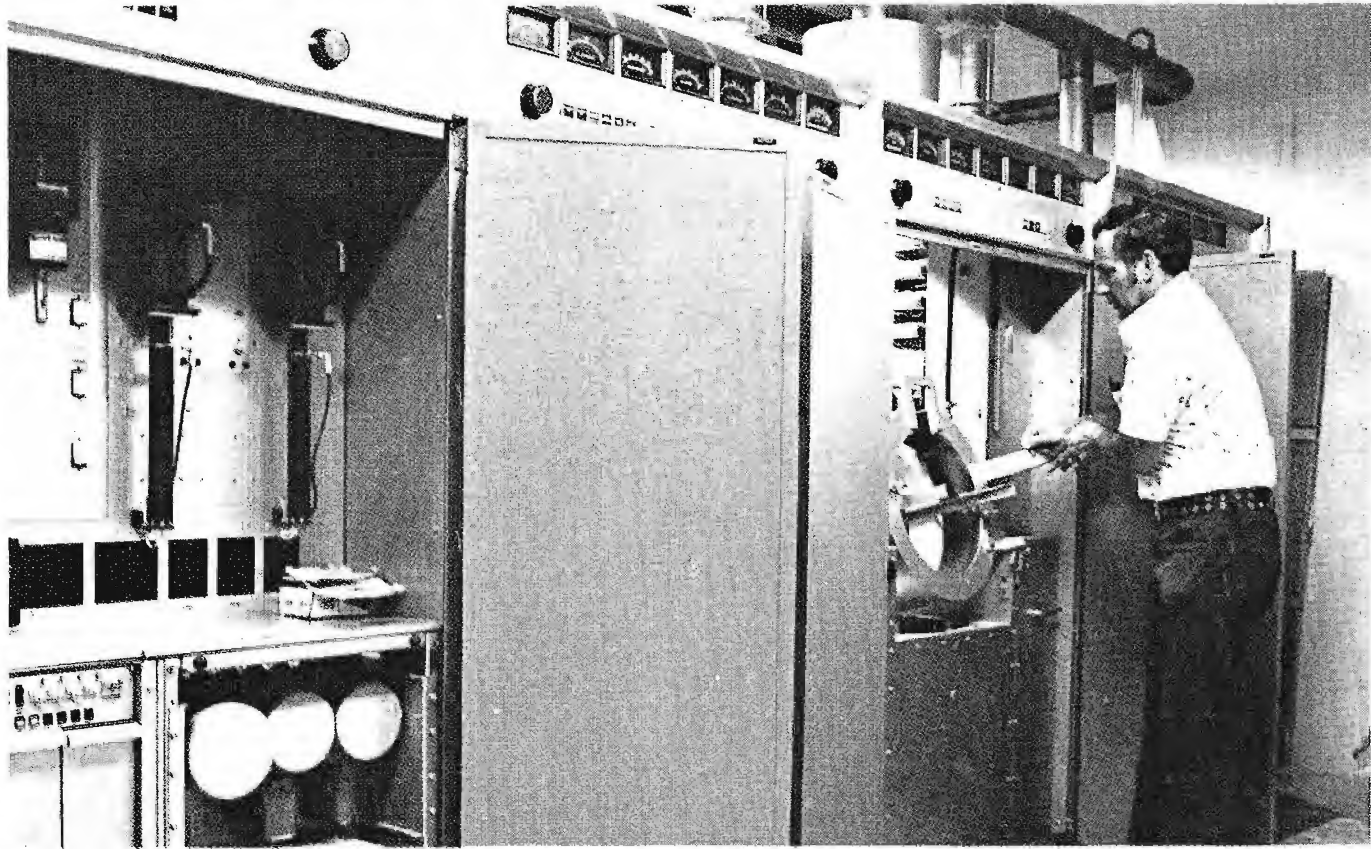
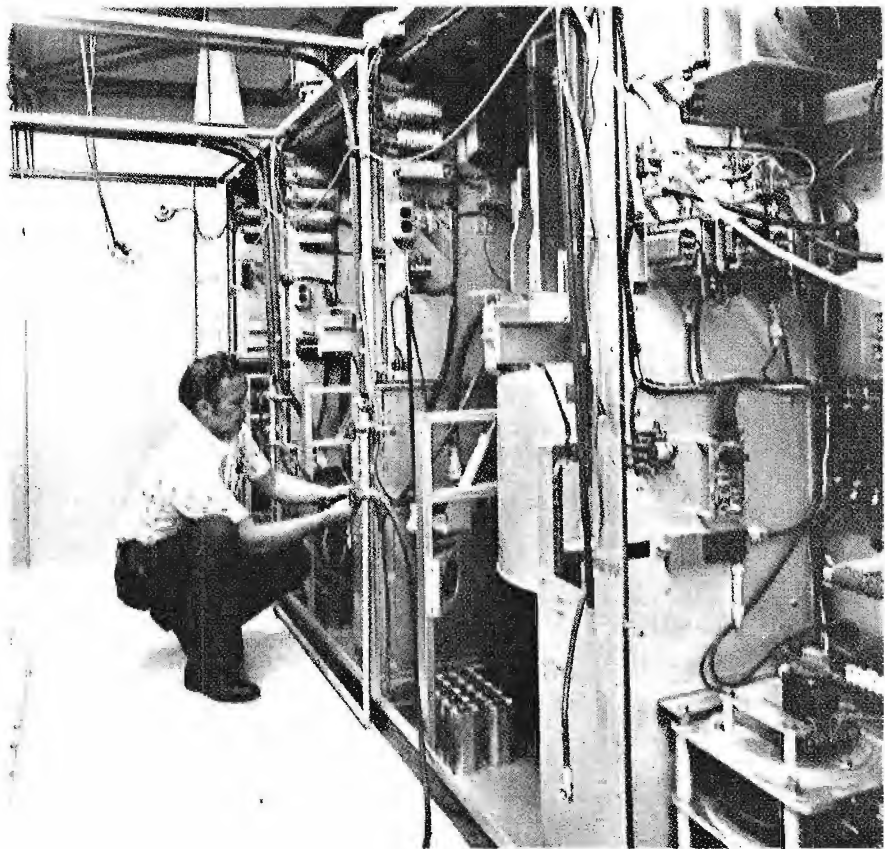
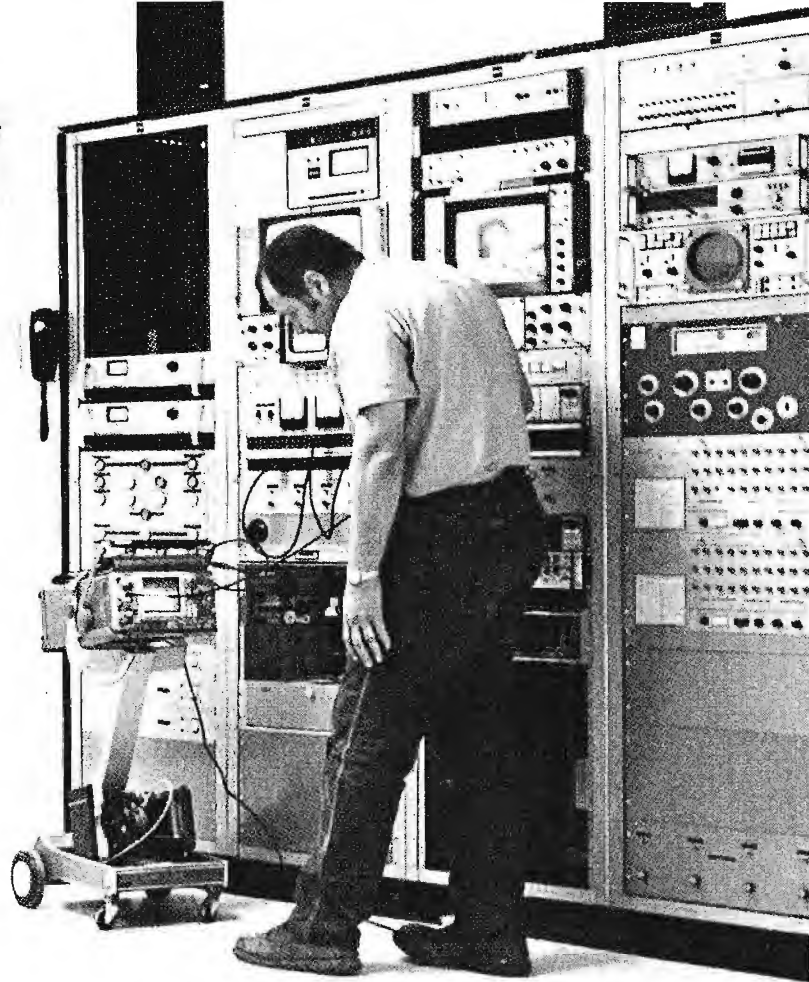
In accordance with plans for maintaining the natural environment of the area, this building gives the impression of being designed to be unobtrusive—a "minimum visual impact" structure.

The Mt. Sutro area is pleasant, with a commanding view of the city. The residential section below the mountaintop is separated from it by a stand of beautiful eucalyptus trees. This green belt is being carefully retained, and on completion of additional planned landscaping, the Mt. Sutro Tower complex will blend smoothly with the attractive surrounding neighborhood.

MEANWHILE, INSIDE THE TRANSMITTER BUILDING . . . the pace quickened as several new transmitters had to be installed, checked and readied for July 4 air date. Photos here depict some of the activity in various transmitter rooms.









### Common Goal Realized

On July 4, 1973, Bay Area viewers made their "Turn to the Tower" for better television reception. This is the benefit, the desired end result.

Even beyond the functional success, however, the tower on Mt. Sutro stands as a monument to the notion that competitive businesses can cooperate to achieve a common goal.

### Mt. Sutro Tower

OWNER: Sutro Tower, Inc., San Francisco (American Broadcasting Co.; Chronicle Broadcasting Co.; Cox Broadcasting Corp.; Westinghouse Broadcasting Co.)

STRUCTURAL CONSULTING ENGINEERS: Albert C. Martin & Associates, Los Angeles

ANTENNA SYSTEM: RCA

TOWER CONTRACTOR: Kline Iron & Steel, Columbia, S.C.

TOWER ERECTION SUBCONTRACTOR: Radio Construction Company, Tinconium, Md.



SUTRO MANSION, a San Francisco landmark, is an anachronism—a pleasant, gingerbread building with centuries-old charm, abounding in fireplaces, beamed ceilings, planked floors and stained glass windows. It housed the transmitting facilities for stations operating from the earlier Mt. Sutro antenna site. The old antenna and tower will be dismantled, and the stations have moved into the new transmitter building.



A FAMILIAR FIGURE at Sutro Mansion, Harry Jacobs is no stranger either to broadcasting or to the Mt. Sutro site. His broadcasting career extends back to the early Thirties. As KGO's Chief Engineer, he was involved in installing the Ch. 7 antenna and transmitter on the mountain way back in 1947—the first TV station to locate there.

On loan from KGO, Harry has been on the scene at Mt. Sutro as the Director of Engineering for Sutro Tower, Inc. since construction began in early 1971. He has been responsible for the day-to-day operation, the endless details: logistics, priorities, specifications, drawings, changes, authorizations, technical approvals.

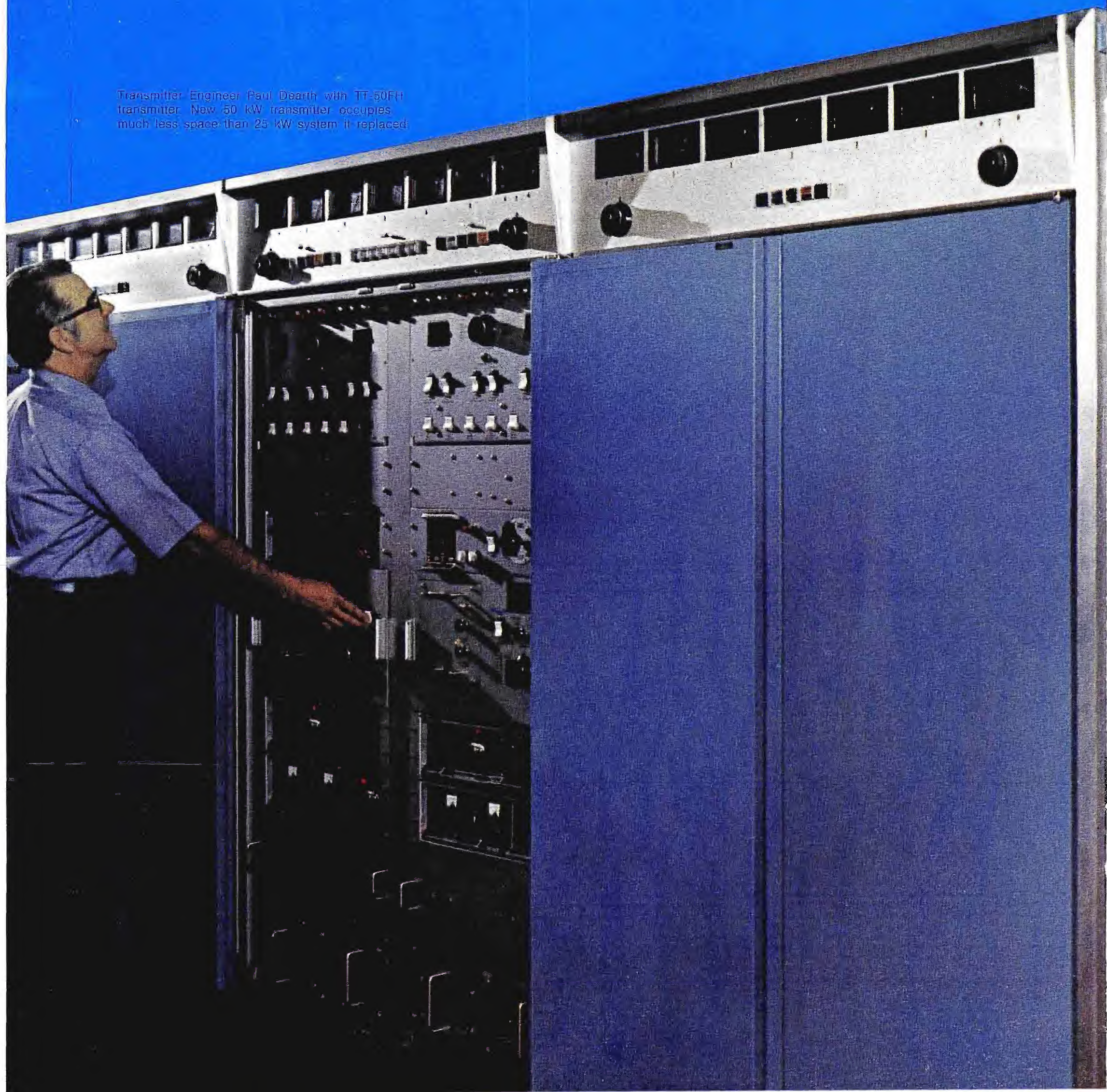




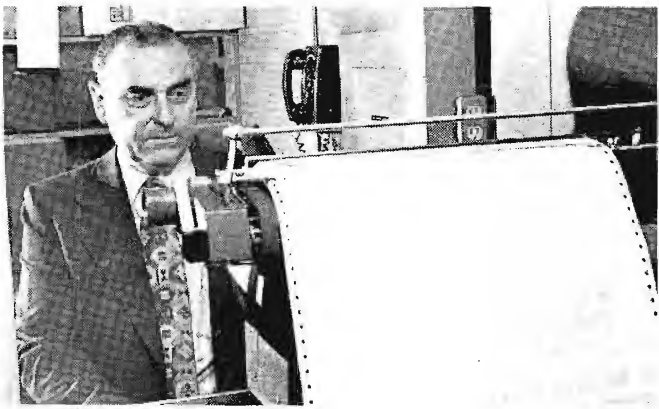


# Pressurized Traveling Wave Antenna — Vital Link in KFMB-TV's Matched Transmitting System

Transmitter Engineer Paul Dearth with TT-50FH transmitter. New 50 kW transmitter occupies much less space than 25 kW system it replaced.







At KFMB's downtown San Diego studio, Manager of Engineering Charlie Abel checks automatic log print-out from transmitter on Mt. Soledad. He has been affiliated with KFMB-TV ever since it first went on-air in 1949.

Today "environmental pollution" is a buzz-word which often reflects a recent awareness of conditions which have existed for some time.

KFMB-TV, San Diego, has been acquainted with, even immersed in a natural pollutant for as long as they have been on the air. Their enemy is the salt in the atmosphere which attacks their antenna with corrosive vengeance. The KFMB-TV antenna on Mt. Soledad is shrouded in a blanket of fog almost every night. This daily salt bath causes deterioration of the antenna components and requires a constant preventive maintenance effort.

#### **First Pressurized U. S. Antenna**

To overcome this severe environmental condition, a new pressurized RCA Traveling Wave antenna Type TW-9AB (Special) was installed in June, 1972. This is the first pressurized TW antenna installation in the U. S. A similar system has been successfully employed in Okinawa to solve the salt-and-air corrosion problem which exists there. With atmospheric pollution problems becoming prevalent in growing numbers of metropolitan and heavily industrialized areas, pressurized antennas may be utilized more frequently in the future.

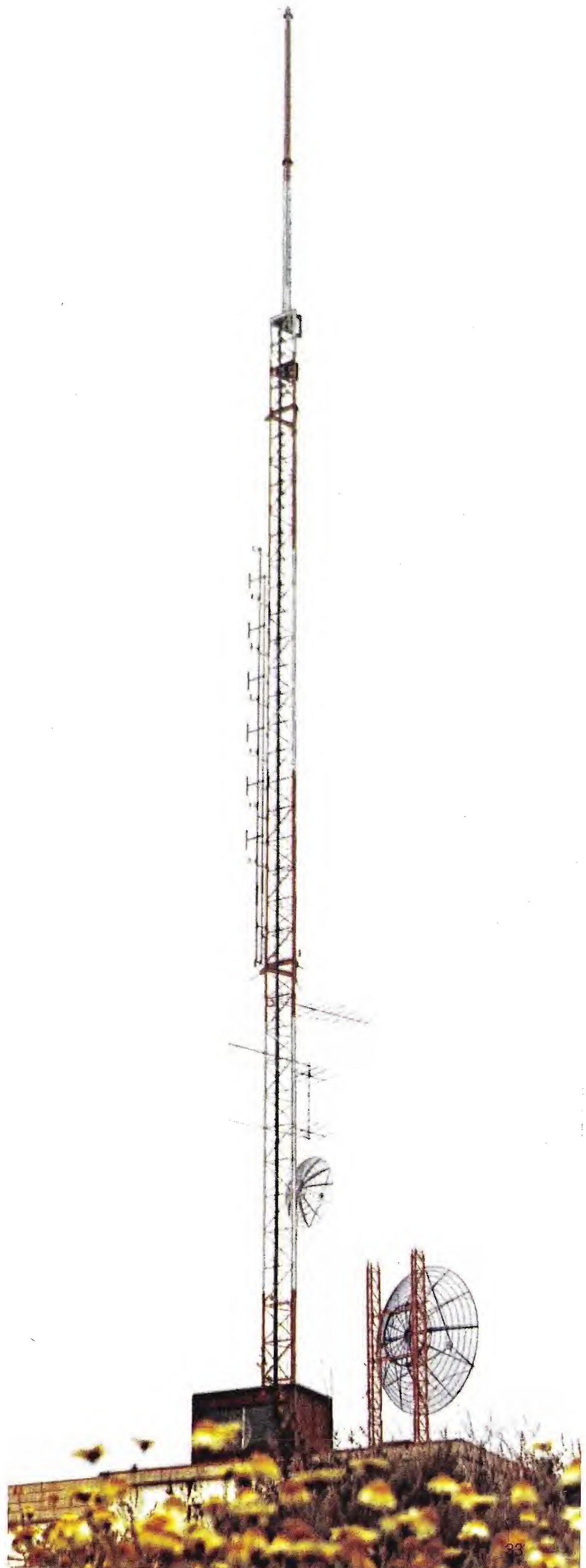
#### **Total Transmitting System**

When KFMB decided to retire their 18-year old Superturnstile antenna, they also weighed the advantages of a total system approach comprising a complete new transmitting plant and antenna, installed and optimized for maximum system efficiency. This plan was practical, since RCA had just announced the new 50 kW parallel transmitter and a new Opto-Switcher at the previous NAB.

By handling the entire system as a long-term investment package, the station would have the advantages of a state-of-art facility plus single-source responsibility. The concept was accepted by KFMB management, and the matched RCA transmitting/antenna plant was specified. Good operating experience with the previous antenna and transmitter, plus RCA's in-depth expertise and backup capability were key factors in the decision, according to Manager of Engineering Charlie Abel.

In choosing the replacement antenna, Mr. Abel noted that two possible solutions to the environmental problem were considered: the pressurized Traveling Wave, and a radome-covered antenna. The Traveling Wave, with its proven, superior performance record, was selected. In addition, the use of a radome type antenna would have increased windloading substantially, requiring the erection of a new tower.

From the golden field of daisies on Mt. Soledad, KFMB's transmitter building and tower extend skyward topped by a new pressurized Traveling Wave Antenna.







After 18 years of service, down the tower goes the KFMB-TV Superturnstile Antenna.

#### **Transmitter Power Increased**

With the Traveling Wave, the antenna gain was decreased to 9, while transmitter power was increased to maintain the authorized 316 kW ERP.

The 50 kW TT-50FH was selected because it provides high power, redundant operation, improved performance specifications, increased reliability and is designed for unattended operation. The system includes an Opto-Switcher to provide optimum VSWR and easier coaxial switching.

It is equipped for remote operation now, with a BTR-30 system and automatic logging at the studio. A telephone line is used for transmission of data and control.

#### **Superturnstile Installed in 1953**

Since going on-air in 1949, KFMB-TV has not had to change its transmitter or antenna site, and the original transmitter building on Mt. Soledad is still in use. In 1953 a new tower and 12-bay Superturnstile antenna were installed. The following year, when Ch. 8 prepared for color operation, the first transmitter was replaced with an RCA TT-25AH, 25 kW system.

The Superturnstile Antenna performed well, but suffered from the corrosiveness of the salty environment. The salt has an electrolytic effect on bronze and aluminum fittings. For preventive maintenance purposes, Mr. Abel said the antenna was split, so that six bays would be operative at all times. A variety of solutions were attempted to defeat the ravages inflicted by the atmospheric conditions, the most effective being a pliable plastic/vinyl compound and taping.

#### **Installing the Traveling Wave Antenna**

In June, there is normally no appreciable rainfall in San Diego. However, when the new KFMB antenna was being installed, Mother Nature responded with a capricious outburst. It rained heavily—a down-pour that obliterated the upper part of the tower at times. Despite the weather, the mounting of the Traveling Wave went quite smoothly. The ease of installation was attributed by Mr. Abel to a special gin pole designed by the rigging company. This was an extra-heavy pole, with a short platform arm at the top which moved easily on a ball-bearing swivel. In moving the antenna into place, one man on the platform was easily able to maneuver the antenna into position. It went up under pressure, sealed at the bottom and carrying a full load of dry nitrogen. The 78-foot antenna mounted on a 210-foot tower went on-air June 20, 1972.

The complete antenna was shipped in two pieces on a flat-bed truck from RCA's Gibbsboro, N. J. facility and was assembled on site at Mt. Soledad.

#### **Pollution-Resistant Construction of TW**

The antenna is fitted with eight "slot covers", four on the upper half and four on the lower half, that extend over the radiating slots of the antenna. Each slot cover is approximately 33 feet long and fabricated from heavy-duty polyethylene material that is resistant to the ultra-violet rays of the sun. Each slot cover is attached to the antenna pole by means of trim strips bolted to the pole and a "silicone rubber" gasket between the cover and the pole that provides a pressure seal. Materials used in the antenna are hot-dip galvanized steel for the outer slotted tube, copper for the inner conductor, irradiated aluminum for the coupling probes, and stainless steel hardware. In addition to protection from salt, these materials are equally effective against the potential hazards of electrolysis or chemical action in industrial areas. The Ch. 8 antenna is kept internally pressurized with dehydrated air at 3-4 PSI.

In going to the Traveling Wave, new 6½-inch Transmission Line was installed—a single run—to replace the two 3½-inch lines used with the Superturnstile.

#### **New Transmitter Takes Less Space**

The new TT-50FH Transmitting System moved in to the existing facility comfortably, without requiring additional construction. The entire system takes up less floor space than the 25 kW transmitter it replaced. To provide room, the original 1949 transmitter was dismantled and removed.

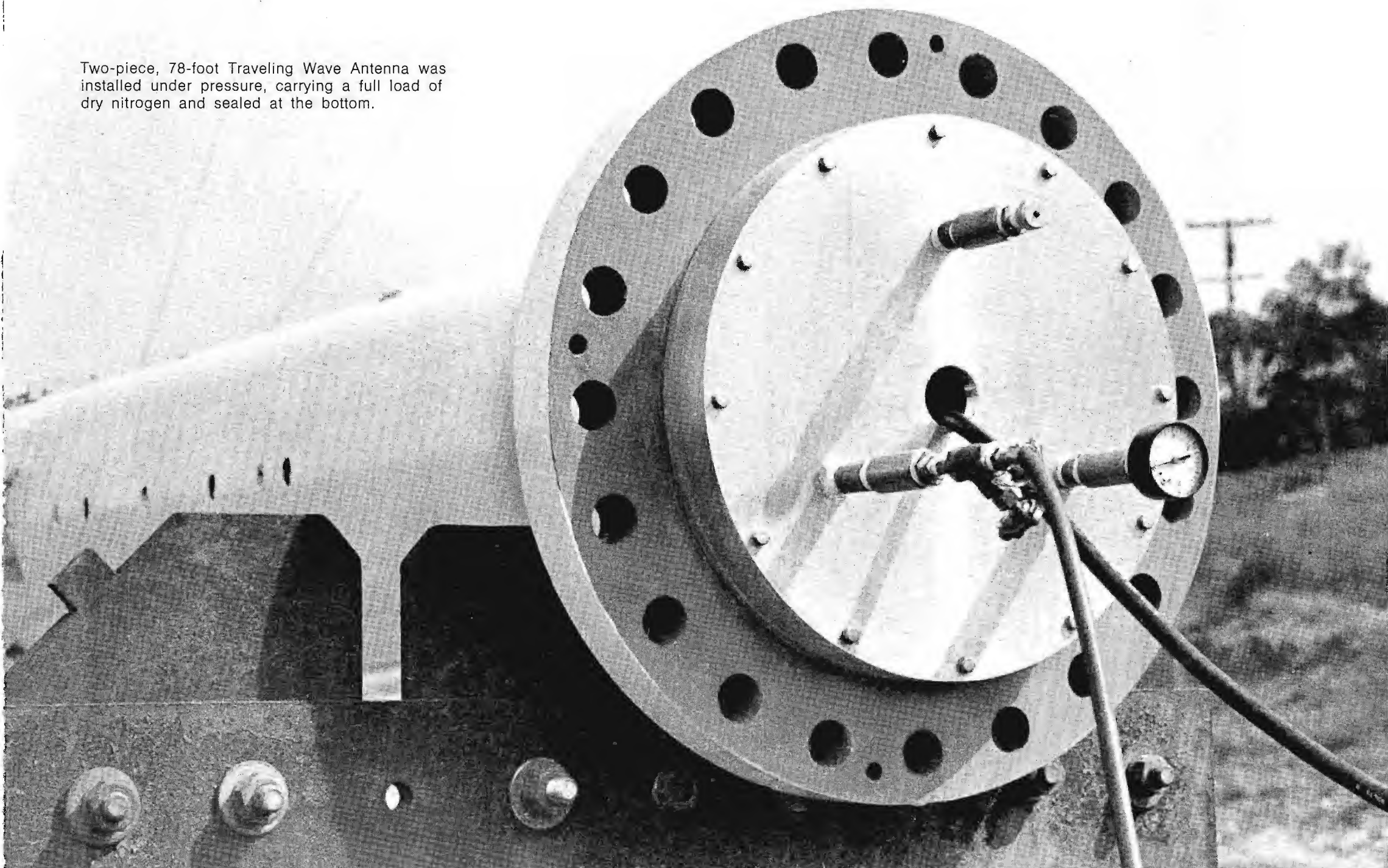
The KFMB transmitter installation consists of three front line cabinets and three back cabinets—two high voltage power supplies, with the Opto-Switcher cabinet in the middle.

The Opto-Switcher—a compact, single-rack packaging of combiners, coax switches and switch panel—aided the installation procedure because it was custom-assembled and pre-tuned by RCA before shipment to KFMB. Since the transmission line lengths were cut to exact dimensions before shipping, on-site installation was a routine operation. With optimization, a lower VSWR is achieved, and color transmission is sharp and clear. The value of the Opto-Switcher is especially notable, Mr. Abel says, when switching from one operating mode to another—from parallel operation to "A" Transmitter or to "B" Transmitter. Tuning is far easier and quicker.

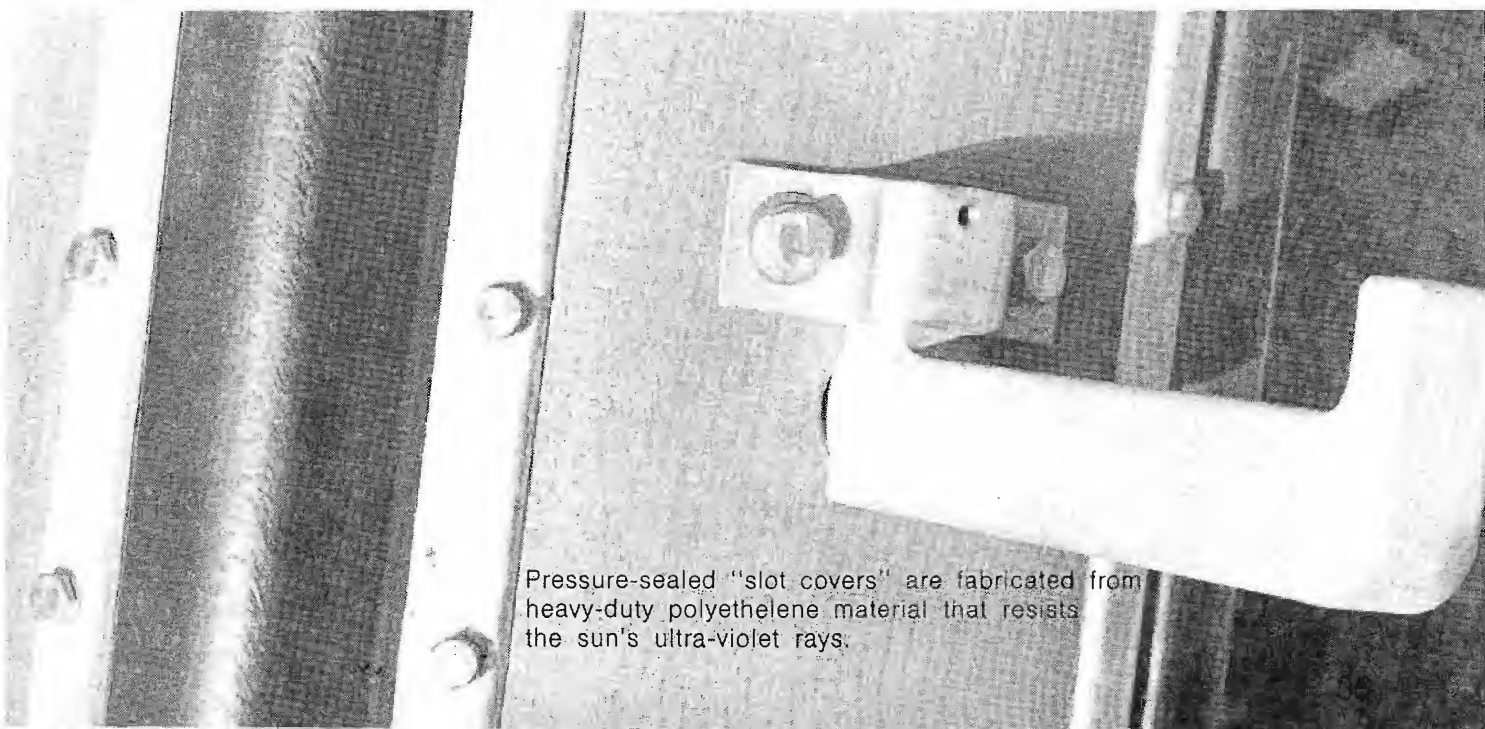
Moving into position is the pressurized TW-9AB Traveling Wave Antenna. Standby antenna extends from right of tower.



Two-piece, 78-foot Traveling Wave Antenna was installed under pressure, carrying a full load of dry nitrogen and sealed at the bottom.



Heavy rainstorm, unusual for San Diego in June, fails to hamper installation of antenna.



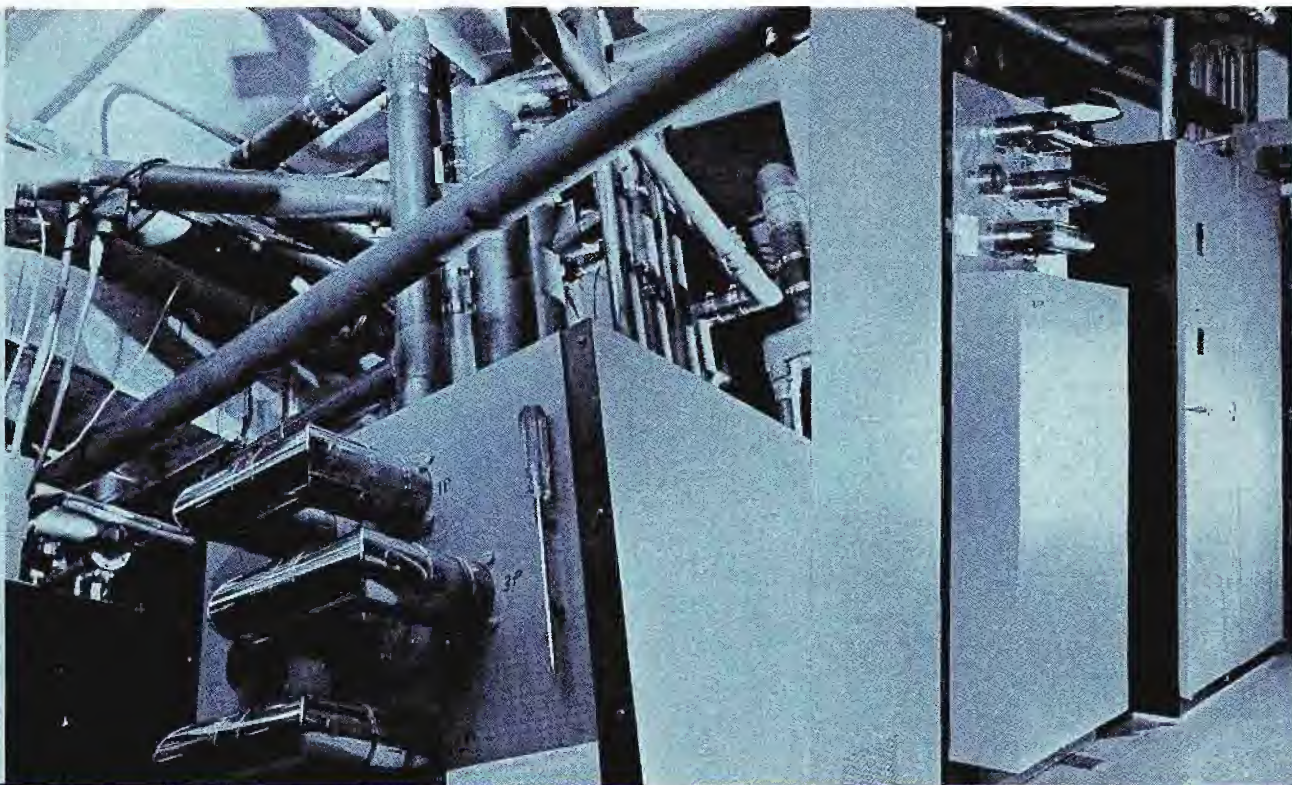
Pressure-sealed "slot covers" are fabricated from heavy-duty polyethylene material that resists the sun's ultra-violet rays.



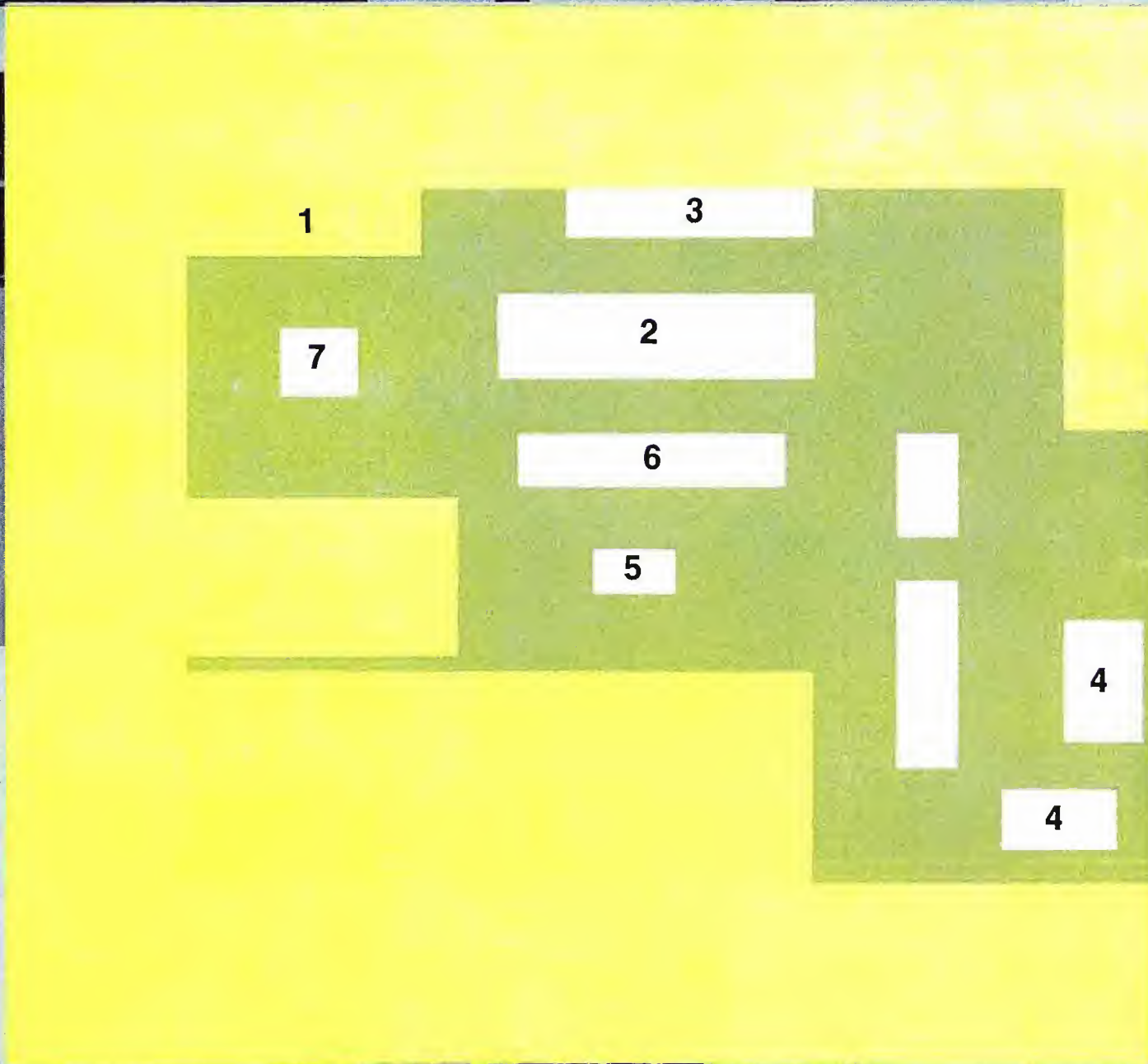
**1** Dehydrated air is used to keep Ch. 8 antenna internally pressurized.

**2** Combiners, coax switches and switch panel are all packaged in a compact, single rack Opto-Switcher. (Right).

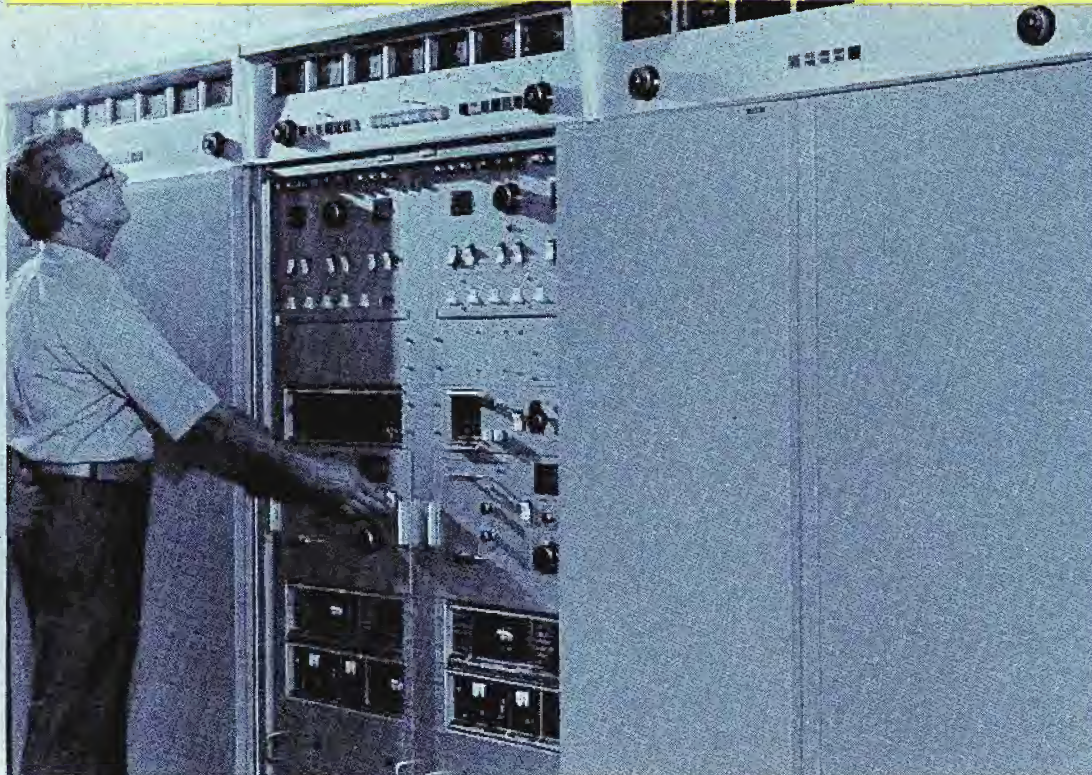
Three rear line cabinets for TT-50FH—two high voltage power supply cabinets with Opto-Switcher in center. (Far right).



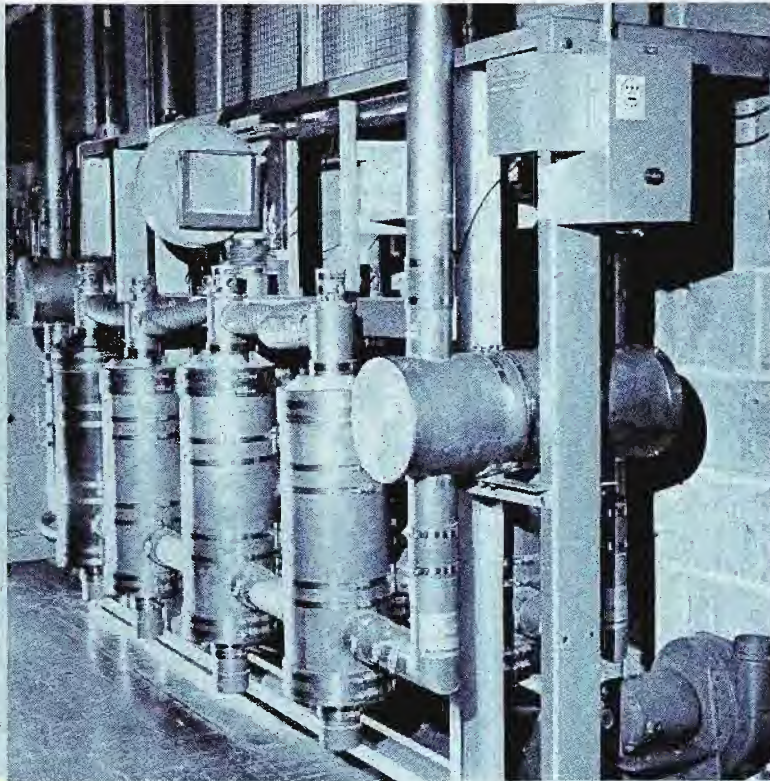
**7** KFMB operates three RCA transmitters—the 50 kW TT-50FH for TV; a 5 kW BTA-5 for AM, and the BTF-10E 10 kW FM transmitter shown here.



**6** TT-50FH front line cabinets provide easy access to controls and circuitry.







**3** Filterplexer and dummy load are conveniently mounted against the wall to take up minimum floorspace.

**4** The durable TT-25AH 25 kW transmitter system is retired, but still housed in the KFMB transmitter building. It occupies considerably more floorspace than does the new 50 kW system.



**5** TT-50FH transmitter is equipped for remote operation, with a BTR-30 system (right) and automatic logging at the studio.

### Advantages of TT-50FH Design

In reviewing transmitter technology, Mr. Abel found a number of desirable features in the TT-50FH system.

"Since KFMB's plans call for unattended operation, the automatic functions of the system were obviously important," he said. "In addition, the solid state design, the stability and the performance specifications were particularly impressive."

The reduction in number of tubes is remarkable, Mr. Abel added. The complete new 50 kW system has only six tubes while 128 were required for the 25 kW TT-25AH. As a result, he said, the transmitter is far easier to tune. Only the IPA and final stages require tuning.

Going beyond all the technical niceties, the real merit of the total transmitter/antenna matched system has to be in the quality of the product it delivers—a better signal.

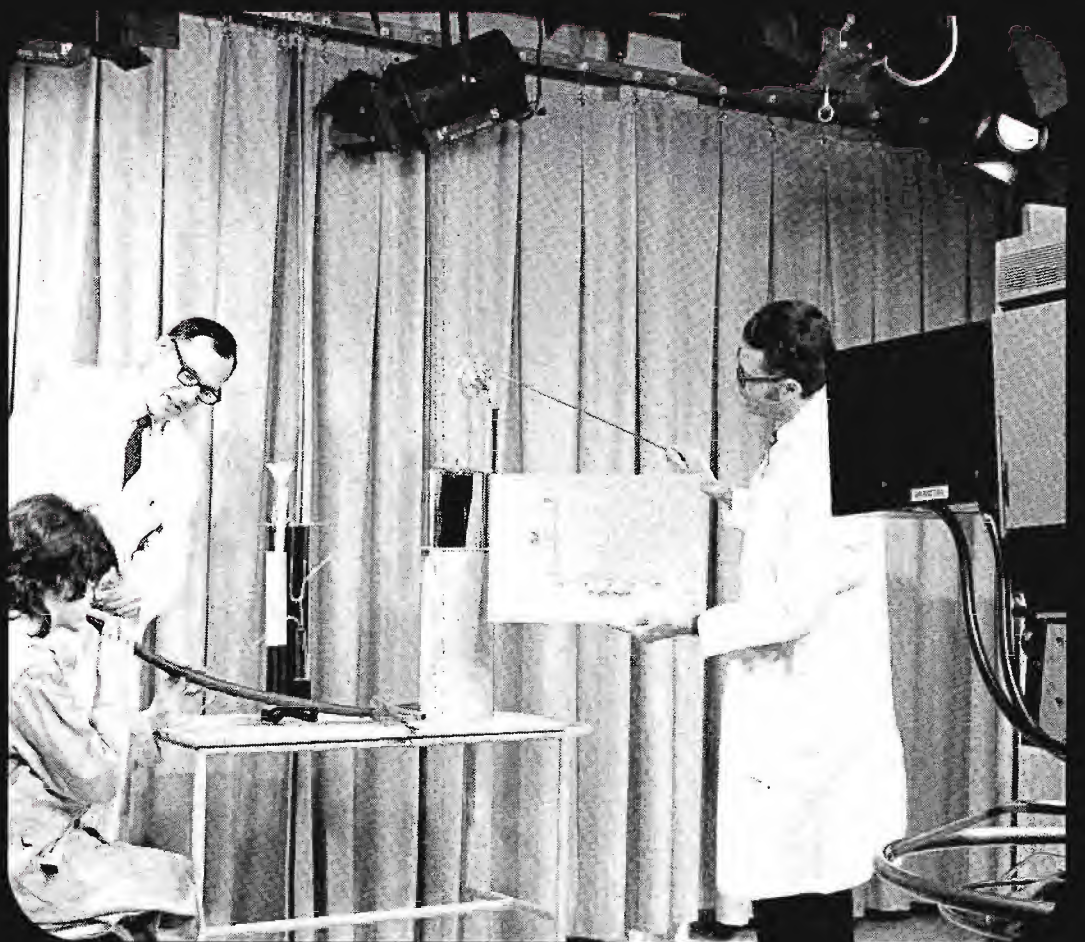
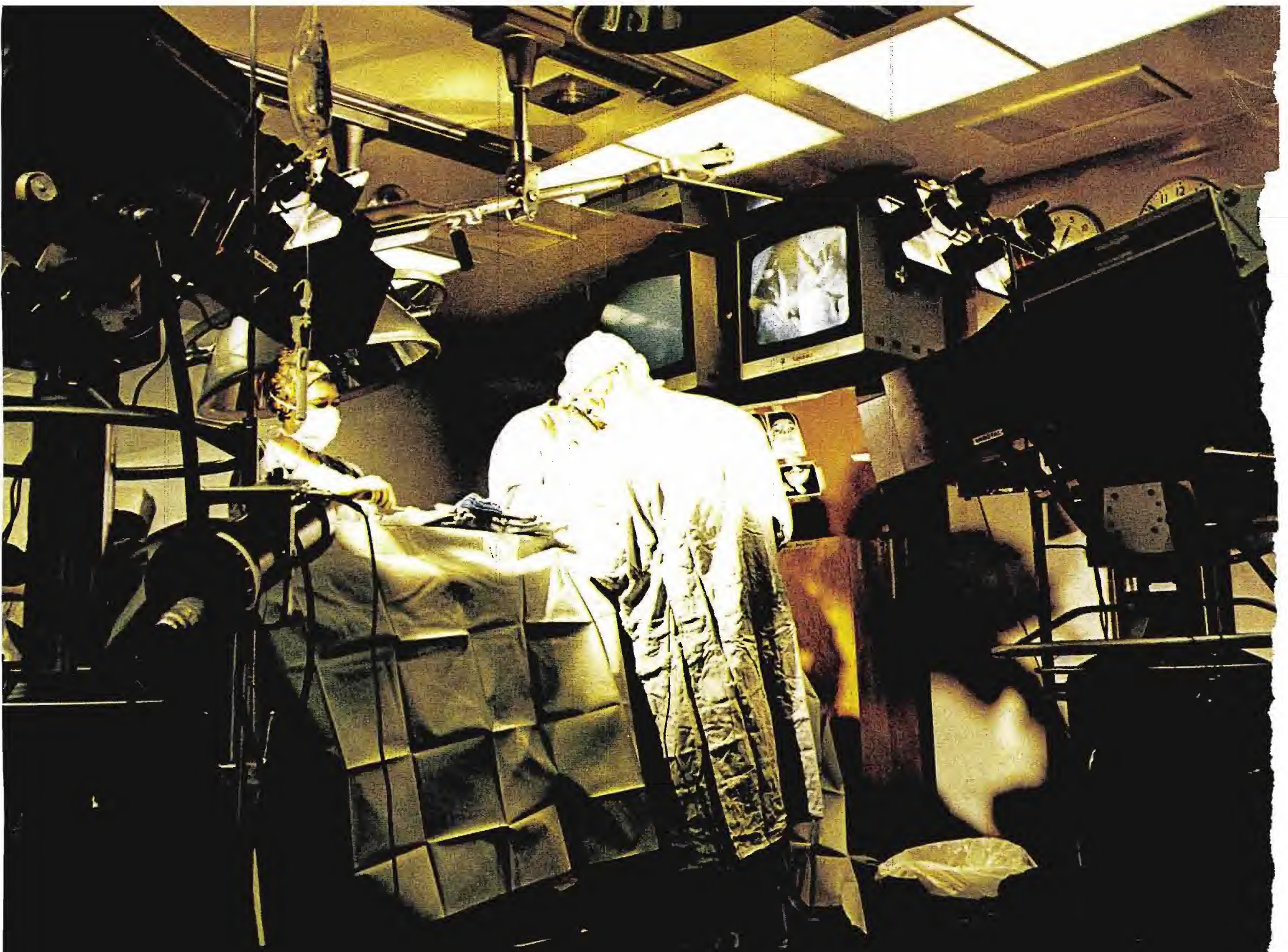
### The Payoff: A Better Picture

Since their new system has been installed, picture quality has been noticeably improved, Mr. Abel affirms, and a better signal is being delivered to outlying areas. He also notes that this is a subjective reaction and no definitive measurements have been made yet. However, some fringe area viewers have reported receiving a stronger, sharper picture.

And other keenly interested watchers—fellow broadcasters—are also well aware of the extra sparkle in the KFMB signal.









Three of the Operating Rooms in the University Hospital are equipped for color television, and are frequently used for televising surgical procedures.

## Medical Television: A Versatile Instrument at The Ohio State University College of Medicine

"Versatile" and "functional" are apt one-word descriptions for the extensive network of television systems now in use at Ohio State University's College of Medicine.

Starting with a black and white system in 1966, the College soon found television to be a useful aid in providing high quality, effective instructional material for the health professions. Subsequent additions have transformed the TV capability to a highly sophisticated full-color broadcast quality system which provides a broad range of specialized programming for distribution by cable to 10 medical buildings in the Medical Complex, including the University Hospital. Up to 12 programs can be distributed simultaneously for viewing on more than 300 color receivers in classrooms, auditoriums, and lecture halls throughout the Medical Center.

### Innovative TV Applications

Frequent and innovative use is made of the TV facilities at the College of Medicine. For example, a recent series of video tapes were produced on the subject of "Patient Education", designed to orient the new hospital patient and to acquaint him with what to expect during his stay—procedures, lab tests, and other areas of interest, such as the mis-use of over-the-counter drugs.

"Split-screen is another TV technique used innovatively at the College of Medicine's Center for Mental Retardation.

### Two Broadcast Quality Control Systems

Color origination facilities are located in the Administration Center of the College of Medicine, and in the Allied Medical Professions Building. The initial color system was completed in 1970, with the Allied Professions Building system added in 1972.

The color system in the Administration Building includes a pair of TK-44 cameras; five 1-inch helical scan VTR's, and a Master Control console with a 12 x 64 switcher and special effects.

There is also a 20' x 20' studio with its own control room. This facility is equipped with water connections needed for some experiments and demonstrations.

The Master Control room is designed so that one man can operate the entire system.

In addition to the studio, programs can originate from other locations in the Administration Center which are equipped with cable connections for the TK-44's. A camera patch panel provides this added flexibility. There are 11 camera outlets in this building.

A similar camera patch panel is located in the University Hospital, so the TK-44 cameras and their control units are easily moved there for Operating Room assignments.

An internal telephone system in the Administration Center Master Control permits faculty to request from the master control that live, tape or film programs be

The medical profession is accustomed to visuals of all kinds—slides, charts, cadavers, movies, television. The problem is to select the best audio-visual solution to a particular situation. At the OSU College of Medicine, this is how a production evolves:

1. The need for a visual aid originates with a department or division at the Medical Center.
2. This Department consults with the Medical Audio-Visual and Television Center to determine the best solution—which available medium is best suited to the objectives.
3. Develop visual aids and script. The script responsibility is with the academic group requesting assistance. Visuals obviously are the function of the Medical AV-TV Center.
4. Produce instructional aids—tape, film, slide, audio or video cassette, etc.



distributed to any specified location throughout the 10-building cable system.

The Administration Center and adjoining Graves Hall facilities include two large auditoriums (393 seats each) and 64 classrooms and seminar rooms as well as a canteen area—all of which are equipped for television reception. More than 120 color TV receivers are strategically located throughout this building.

#### **Allied Medical Professions Building TV Production Center**

The color TV installation in the Allied Medical Professions Building is a major production area operated by the Center, consisting of two full-color television studios and master distribution for the entire Medical Center. Other facilities here include an audio recording studio, set construction, graphics production area, and office space. Master Control for the TV production center provides separate positions for Video Control, Audio Control, and for the Director. A wall of monitors displays the output of available sources:

Telephone intercom system permits faculty to request live, tape or film program from TV master control. More than 300 color receivers are installed throughout the Medical Center.



Chief Engineer Bob Hankey takes a call on telephone intercom system which links 10 Medical Center buildings.

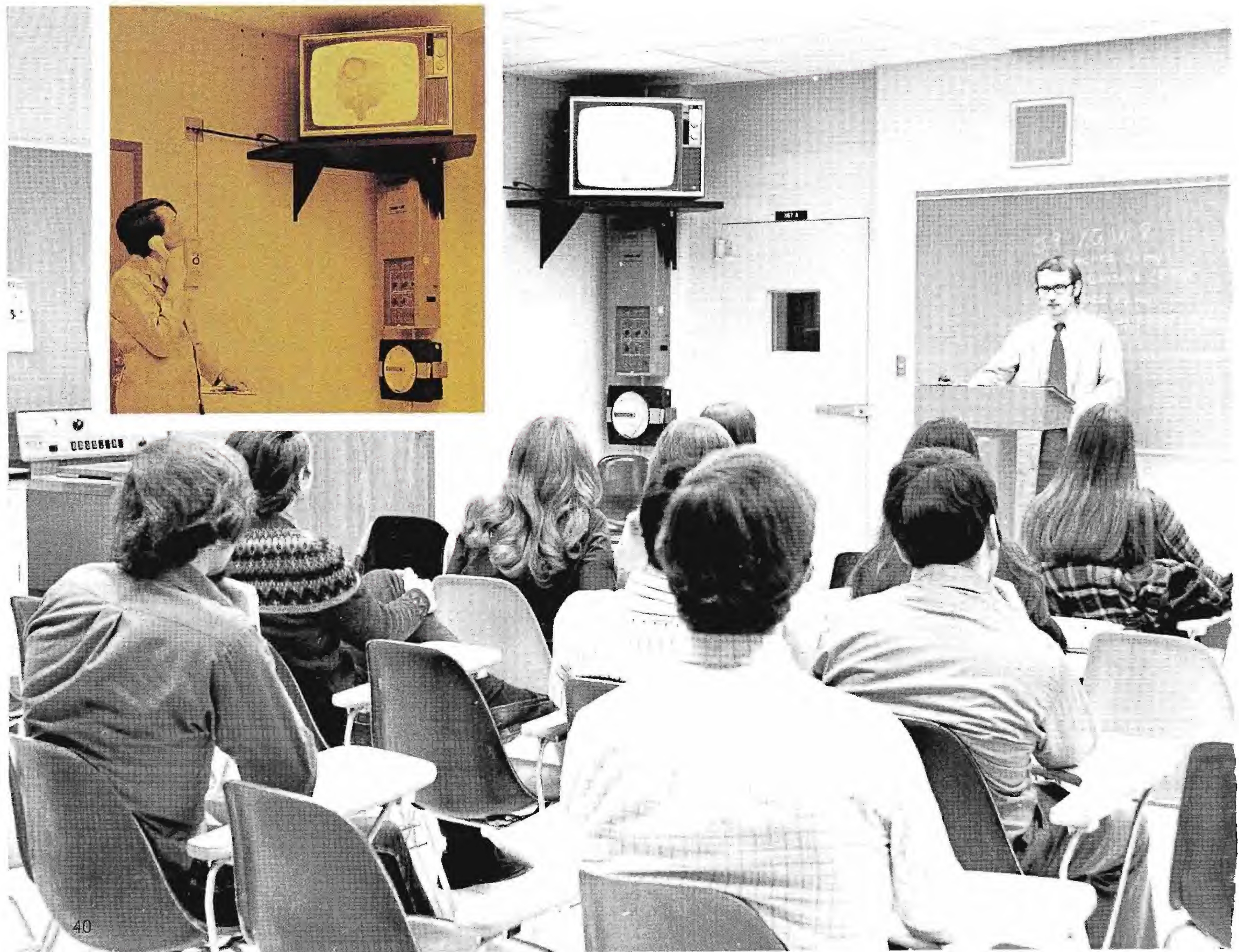
Two TK-44 cameras (these are in addition to those in the Administration Center); two TR-60 color quadruplex tape recorders, and a TK-27 color film system. This facility also includes a master distribution switcher for all 10 buildings.

This versatile arrangement has the capability of handling and integrating live, tape, film and slide material. The production timetable for a medical school is just as critical, if not more so, as for commercial stations, because the "talent" involved is usually a doctor with an extremely tight schedule.

The main studio is large by any standards, with ample space for more than one set. The second studio is smaller, but adequate in size. Master Control is located between the two studios. There also is a storage room and woodworking shop which is used for making many of the props and sets.

#### **Small staff "does it all"**

The Medical Audio-Visual and Television Center staff of 20 "does it all"—technical requirements, operation, maintenance, and production. And not just for TV. The same small group is responsible for all audio





visual—films, slides, charts, overhead projections, audio tapes—even including the custody of all AV equipment which is available on a loan basis to staff and faculty members.

Robert (Bob) Potts, Director of the Medical Audio-Visual and Television Center, is affable and articulate—desirable traits for keeping the Center operating smoothly, meeting the many large and small demands made on it. A graduate of the University of Cincinnati, Bob came to OSU's College of Medicine in 1966, following a commercial broadcasting career. At WCPO-TV, and WKRC-TV, Cincinnati and WQED-TV, Pittsburgh, he moved through the production ranks to Director and Program Manager. Before joining The Ohio State University, College of Medicine, he was an Executive Producer at WTAE-TV, Pittsburgh.

The technical staff of six is headed by Chief Engineer Robert (Bob) Hankey, and includes four engineers and an Assistant Chief Engineer.

Mr. Hankey has been associated with The Ohio State University in various capacities

since 1955, with previous commercial television experience. While working at the University's TV station, WOSU-TV, he became involved with campus electronics, installing several video systems.

In 1966 he came to the College of Medicine to work on their video requirements, and is now responsible for the operation and maintenance of numerous color and monochrome TV systems for teaching, training and surveillance. He is also deeply involved in planning new systems as well as expanding and updating present systems.

Television, Bob Hankey's experience shows, seems to grow like Topsy. Once a system is installed and operating, it quickly expands. The addition of color capability, he says, has had the predictable effect of reducing the utilization of the monochrome systems.

There has been a rapid increase in demand for color productions, according to Bob Potts. Nearly 400 productions were handled in 1971; a like number in 1972, and an increase is projected for this year. He also notes, not without a measure of

pride, that 95% of the video tape material used at the College of Medicine is produced by the Medical Audio-Visual and Television Center staff and facilities.

#### Why Broadcast Quality?

In response to the question: Why broadcast quality equipment for a closed circuit system, Mr. Potts quickly responds: "Quality is needed in the medical field even more than in commercial entertainment television. Full color fidelity is essential for realism."

In going to color, broadcast quality equipment also was specified, Mr. Potts adds, because some "on-air", open broadcast applications were anticipated. This year, for example, four statewide telecasts are scheduled for production in conjunction with the Center for Continuing Medical Education. These programs are televised "live and in color" over the statewide Ohio Medical Education Television Network to thirty or more hospitals in Ohio and West Virginia.

The Medical Center at The Ohio State University will soon have a further

TK-44's on set of main studio in Allied Medical Professions Building.

Large Master Control room for TV production center provides separate positions for Audio and Video Control and for Director.





capability for 'round-the-clock health care delivery to patients through a two-way audio and video microwave facility. The microwave connects University Hospitals in Columbus to O'Bleness Hospital in Athens and the Holzer Clinic in Gallipolis. Switching for this network is handled through WOSU-TV and WOUB-TV.

Mr. Hankey notes that "TK-44's are excellent for medical applications. They're stable, easy to set-up and give little trouble. There just isn't a finer camera available."

Quadruplex tape recorders were specified because the Center does a considerable amount of editing as well as dubbing. The TR-60's are used for preparing master tapes which are then dubbed to 1" helical scan tapes for classroom distribution.

The Medical Center is now moving toward video cassettes. The quad VTR's will provide master tapes for dubbing to cassettes. These will then be available in the Health Sciences Library for use by students in study carrels.

#### University Hospital TV Systems

The University Hospital has several independent TV systems in use, including a small monochrome studio and control room, complete with video taping capability. This Control Room also has a patch panel for connecting the TK-44 cameras used for televising operations in color.

Three of the Operating Rooms in the Hospital are equipped for origination of surgery, and several lecture halls and classrooms are equipped for color TV reception.

Because of the color capability, Operating Rooms are used frequently for televising surgical procedures as part of symposiums or major medical conferences held at the College of Medicine as well as for instructional applications.

The telephone intercom system enhances this procedure by permitting two-way audio between the Operating Room, lecture halls and classrooms throughout the Medical Center.

For working in the Hospital Operating Room, a rectangular mirror was installed

adjacent to the surgical light. This is a counter-balanced arrangement, and one man changes the mirror angle to be sure the camera is getting the right picture. A 23" viewing monitor is provided for this purpose. One TK-44 uses the mirror for a picture source, while the second camera covers the overall scene and other important aspects of the procedure.

Some University Hospital areas are equipped with remote control cameras for viewing operations, monitoring patient recovery, and treatment. Some of these systems are used for research. One small system permits observing patients undergoing radiation treatment without exposing hospital personnel. Another single camera system recently installed in the Maternity Ward lets parents of "Preemies" see their tiny offspring on the TV screen.

#### Constant increase in TV utilization

As the College of Medicine expands, so does its usage of television and the requirement for color. Major color originating systems are operating in the Administration Center and in the Allied Medical Professions Building, and the School of Nursing can distribute color video tape material.

A color system has been installed in the Mental Retardation Unit (McC Campbell Hall) and will soon be in operation in the Ambulatory Out-Patient Building which is now under construction.

The School of Nursing uses TV regularly to teach nurses in their most challenging environment—in the Operating Room. Television provides an unequalled opportunity to show nurses correct OR procedure, via video tape presentations. Tapes have been produced on all facets



Director of Medical Audio Visual and Television Center, Bob Potts (right) and staff member Leighton Reynolds preview a video tape. TR-60 VTR's are used at OSU Medical Center for making master tapes for dubbing to 1-inch helical scan tapes for classroom distribution.



of nurses' involvement in the Operating Room, ranging from showing correct procedure for laying out surgical instruments to "gowning" and "gloving". The School of Nursing Building, Newton Hall, is equipped to receive instructional TV programs in all classrooms and in one lecture hall. A small distribution control room handles all incoming signals from other buildings as well as those originating from the color helical recorders in that room.

The educational program at the Nisonger Center for Mental Retardation is designed around the use of television and other types of audio visual tools. The closed circuit color television system facilitates the Center's clinical, diagnostic and training objectives through the use of live and video taped instructional programs. The TV system here includes 35 camera lo-

cations and a routing switcher, permitting the transmission of up to 12 programs to any of 42 locations within the Nisonger Center.

#### A Diversity of Video Tapes

Utilization of television materials is no problem at the College of Medicine. Just about every department there is finding useful applications.

The Psychiatric Nursing Division has developed a series of tapes for their requirements including such subject matter as "Holds and Restraints".

The Dietetic Department had a retiring expert baker do a tape on baking techniques.

Patient education is receiving major emphasis. A new series of tapes has been produced for hospital orientation to an-

swer questions most frequently asked or of most concern to the new patient. (Distribution of the patient tapes is no problem at University Hospital, since their RF system has four local commercial television channels and four more hospital program channels.)

Often doctors affiliated with the College of Medicine or the University Hospitals ask for dubs of tapes when going to make guest lectures at other hospitals, symposiums, etc. The Medical Audio-Visual and Television Center is happy to provide this service.

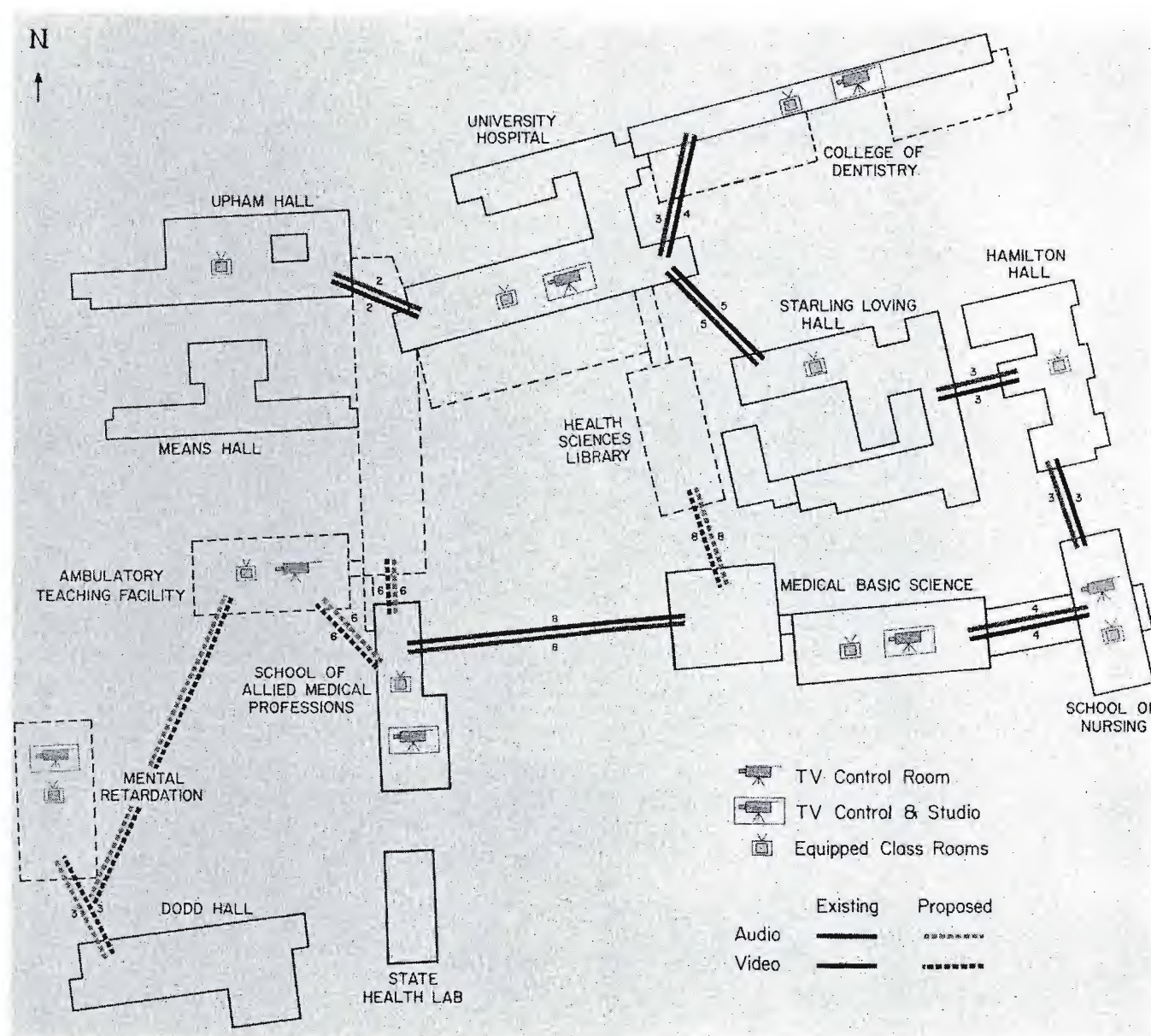
#### A "Lab" for Medical Communications Specialists

There is yet another important function served by the facilities of the Medical Audio-Visual and Television Center at the College of Medicine. That is in providing an excellent laboratory for students pursuing a career in "medical communications". This new and challenging area of undergraduate study is designed to produce specialists who can effectively bridge the communication gap between research discovery and application in medical and health fields. These skills are obtained through the study and application of communication theories and techniques, in a medical environment.

#### Summary

Through the use of audio-visual and television tools, the Medical Center at The Ohio State University is achieving these goals:

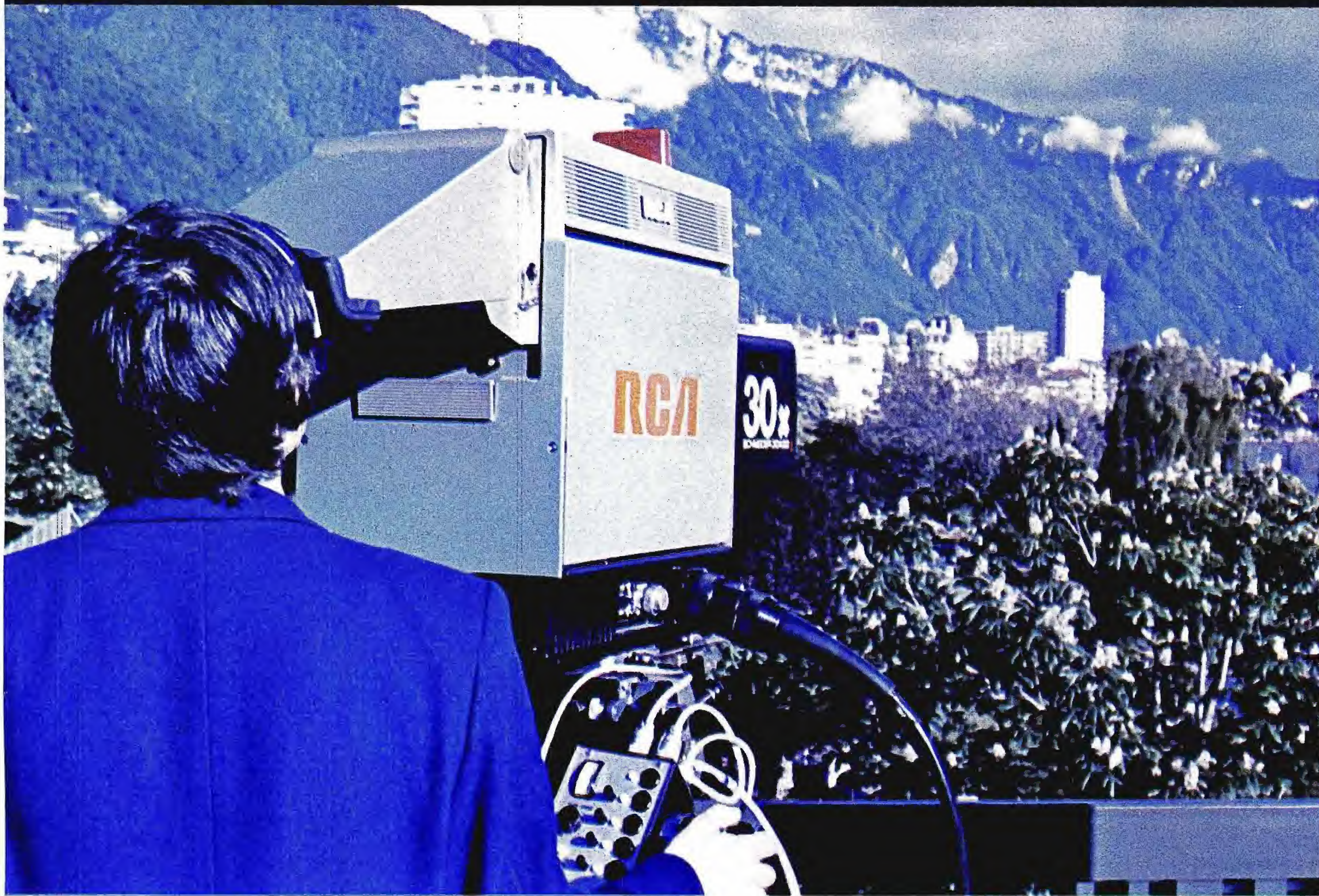
- Improving instructional methods in the classroom.
- Aiding faculty in presenting demonstrations that otherwise could not be observed by the student in group instruction.
- Producing software to assist students in master curriculum requirements.
- Permitting students to self-pace their instruction by providing ready access to instructional materials via a retrieval system.
- Improving hospital patient care through development of special instructional materials for use by health professionals, students and patients.



Ten Medical Center buildings are connected by cable. Five buildings include TV control rooms with capability for distributing up to 12 different programs simultaneously to all areas within that building as well as the entire Medical Complex. Drawing identifies available TV facilities and buildings involved.



# RCA at Montreux '73



Outside, RCA's TK-44 color camera (above) scanned picture postcard scenery. The sparkling pictures it delivered to monitors in RCA's exhibit delighted and impressed many show goers.

At this year's TV exposition in Montreux, Switzerland, world delegates checked out RCA's latest equipment on show in the lakeside resort's new Convention Center.



When this year's NAB show closed, RCA was already well into preparations for a European version—the 8th International Television Symposium and Technical Exhibition. Considered a focal point for the world broadcasting industry, it was held from May 18-24 in Montreux, a picturesque Swiss resort on the Lake of Geneva.

Over 1500 delegates and nearly 100 exhibiting companies from over 30 countries materially contributed to the success of this year's major biennial event.

It is not as mammoth as NAB in overall exhibition space and number of visitors. But it boasts several characteristics to make it the world's largest truly international broadcast show.

A look-see at Montreux's list of exhibitors reveals companies not only from all of Europe but also from the U.S. (obviously), England and the Near and Far East. Some do not exhibit at NAB. Others, like RCA, do.

The Symposium is even more exotic. It is a magnet attracting outstanding experts in broadcast technology from far flung corners of the globe. Broadcast specialists from the States, Germany, France, Japan, and even India reported on the state of the art, and on new developments in studio techniques, in their respective countries. Strict guidelines issued by the Executive Committee, with the help of corresponding members, helped maintain the very high level of papers for which the Symposium has gained an eminent reputation.

RCA's leading technical specialists delivered five papers at this year's Symposium. Topics dealt with video tape cartridge field experience; automatic film handling techniques for television; new color telecine camera developments; head-wheel reconditioning and manufacturing and the possibilities for a new compatible quadruplex standard.

#### **From the Beginning**

RCA Broadcast Systems was on deck at Montreux for the first exhibition in 1957.

Prior to the Montreux event, RCA broadcast product distributors from Europe, Africa and the Middle East convened at RCA Jersey Ltd., a new production center serving Geneva marketing area requirements.



It recognized then that there was an additional need for making a comprehensive product line available to Continental broadcasters.

In 1965, RCA International Marketing, S.A. was set up in Geneva to market and service video and audio products in the U.K., Europe, Africa and the Middle East area.

The Montreux showcase helps facilitate doing business there by enabling European broadcast managers and engineers to see RCA's newest and most advanced systems in action.

#### **New Times, New Technology**

This year, the company's stand focused on major video systems with automatic features oriented to the user. And for good reason. Needs are emerging outside the States too for studio systems capable of achieving optimum picture results and top operating efficiency, automatically.

In Western Europe, for instance, TV expansion is on an upward spiral. Second or third networks have recently been, or are being, added in many countries. Regional TV broadcasting is growing rapidly. And more TV programming is being generated on both national and regional levels.

As a result, many TV production departments are being subjected to continual changes in manpower requirements, and the talents of their best people can not be used to their full capabilities.

Futhermore, all of this is seen as an increasing tendency in the future calling for more and more "automatics".

#### **New Ideas in Programming**

One solution shown at Montreux was the famous TCR-100, RCA's simplified approach to automating sophisticated programming of short-event sequences.

The demonstration revealed important new ideas for programmed playback of short taped segments typical of the program content in Continental broadcasting establishments. Being government owned, most organizations have to handle commercial episodes under rules and restrictions quite different from those in the U.S. Other short-segment fare is contrary to that in the U.S. too.

However, differences aside, the theater presentation pointed out that the versatile TCR-100 finds applications there too.

The demonstration featured a standard TCR-100 automatically handling an abridged sequence of program events. The type European stations could advantageously convert to the cartridge format: educational spots, ID's before each transmission, material for interludes or program gaps, station interruptions, one-minute weather reports aired several times a day, highlights of athletic events and announcements of upcoming programs.

#### **A Program Assembly Machine**

A second TCR unit in the stand, available for hands-on demonstrations, emphasized operational simplicity. At the same time, it allowed international broadcasters to witness operation of the newly incorporated Continuous Record facility for cartridge to cartridge recording.

Permitting dubbing of material of indeterminate length, this option opens new production capabilities. Many viewed it as an ideal solution to handling the incoming Eurovision news feed, which forms a significant part of their production efforts. Continuous Record would uncomplicate the usual modus operandi: tying up reel-to-reel VTR's, cueing, rewinding, cutting and editing to prepare and select the right segments for airing.



TV program producers believed Continuous Record would also provide a high degree of flexibility in selecting not only news highlights but other short video with audio segments.

An even stronger indication that Continental broadcasters have real applications for this TCR feature was Yorkshire Television's finalizing their order at Montreux for that very unit. Yorkshire TV is a member company of the U.K.'s Independent Broadcasting Authority.

To satisfy European tape production requirements further, RCA announced at the show that its Jersey, Channel Island, facilities will begin direct Continental shipments of the TCR by mid-summer. For the past year, RCA Jersey, Ltd. has been the final assembly, test and shipping point for TR-70's and TR-60's only. Now, the expanded operations promise even more benefits in faster service and lower freight costs to TCR customers too.

#### **More TV Tape Innovations**

In the reel-to-reel area, another development of keen interest to Montreux visitors was RCA's European version of the highly-automated TR-70C. It contains all the circuitry necessary for stable, interchangeable operation on either PAL or SECAM TV signals. Selection of the playback standards is accomplished by a single switch.

This TR-70C was most appealing, naturally, to broadcasters serving both France, which is on the SECAM standard, and the majority of European countries on the PAL color system. However, teleproduction companies wishing to expand their business to include PAL or SECAM countries showed serious interest too.

With news events an essential ingredient in European programming, the TPR-10 "on-location" quadruplex recorder was a major attraction too. Developed originally for airborne use, this color video recorder produces up to 20 minutes of programming for playback on any standard broadcast

tape machine. Broadcasters thronged around the unit to hear more about features like ruggedness for field service, plug-in modules and the master erase head facility.

#### **Problem-Solving Cameras**

Assembled from major elements of a standard TK-44, a new portable pack camera concept was dramatized as an economical means of achieving studio quality and stability in portable camera applications.

The camera studio presentation drew crowds show after show as it also unveiled the TK-45A with its four new fully automatic features for faster setup and sharp, quality pictures.

It seemed most appealing to broadcasters from Western Europe's major PAL color TV centers, the designs for which were initiated only about five years ago.

With automatic white and black balance, automatic iris and automatic centering, the camera minimizes subjective assessment of picture quality. This can facilitate the establishment of acceptable quality standards for pictures transmitted across long international connections.

In telecine operations, European broadcasters—like their U.S. counterparts—complain about widely varying quality in available color film and slides, and the time-consuming adjustments equipment without automatic features requires.

For the first time, they saw the TK-28—one of the few available telecine cameras incorporating automatic technology. The result is an ability to correct automatically color balance and other technical variations visible in motion picture film and slides. RCA demonstrated two TK-28's, one with lead-oxide imaging tubes; the other with standard vidicons. Broadcasters watched side-by-side demonstrations and saw that the quality is nearly indistinguishable. Video Cassette Industrie, a post-production house in Paris, took delivery of the lead-oxide version after the show.

RCA's breakthrough in film-handling for TV, the TCP-1624 automatic film cartridge projector, got a lot of attention too. Currently, film material in Europe is mostly 35 mm. However, advertising executives and firms engaged in producing filmed commercials were there checking out the equipment available for showing commercials on TV. Understandably, this premier showing of the 1624 was intended to determine the need for a European operating version, 25 frames and 50 hertz. It will be made available when demand develops.

#### **The Why of It**

The Montreux exposition mirrors European markets which RCA Broadcast Systems has been cultivating for a long time.

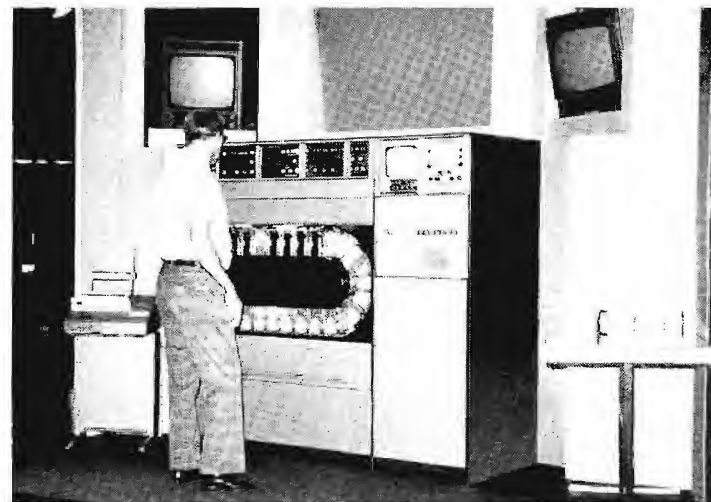
Attesting to that fact is the great amount of RCA TV and audio equipment already in use there. For example: audio equipment at Radio Manx on the Isle of Man and at OY Yleisradio in Helsinki, Finland; cameras and video tape cartridge machines at Westward TV and London Weekend TV in the U.K.; numerous reel-to-reel machines at Westdeutsche Rundfunk (WDR) in Germany, Radiotelevisione Italiana and ORTF (the French national broadcasting service).

Most impressive is an array of cameras, VTR's and telecine units at Österreichischer Rundfunk in Vienna, one of the world's great television centers.

What's more, RCA has also furnished fully-equipped, custom-made color OB vans for Radio-Television Beograd in Yugoslavia, the Nigerian Broadcasting Corporation in Lagos and the Israel Motion Picture Company to name a few.

There are many more installations, all representing solutions to communications needs. RCA believes that its active role in the Montreux Symposium and Exhibition helps bring broadcasters' requirements to fulfillment.





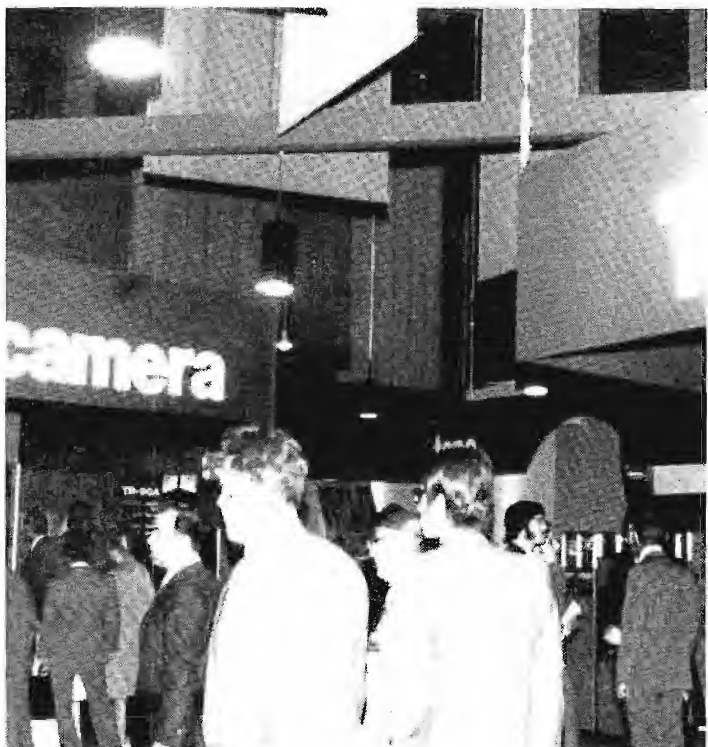
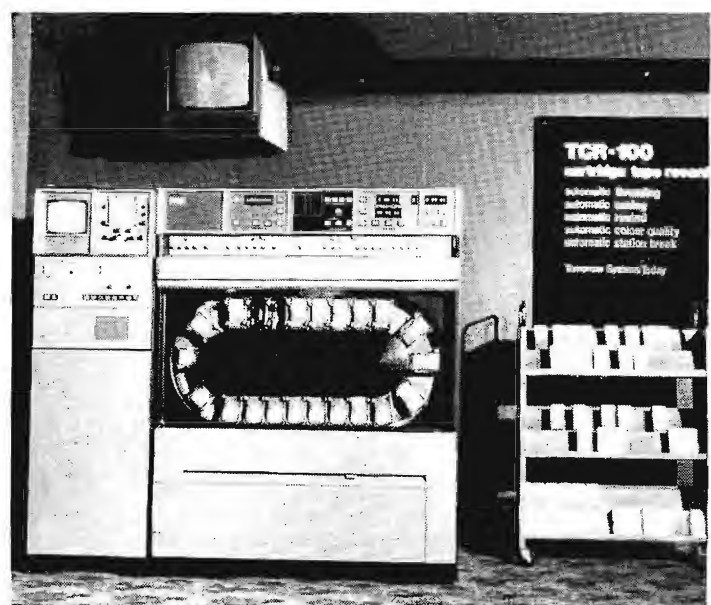
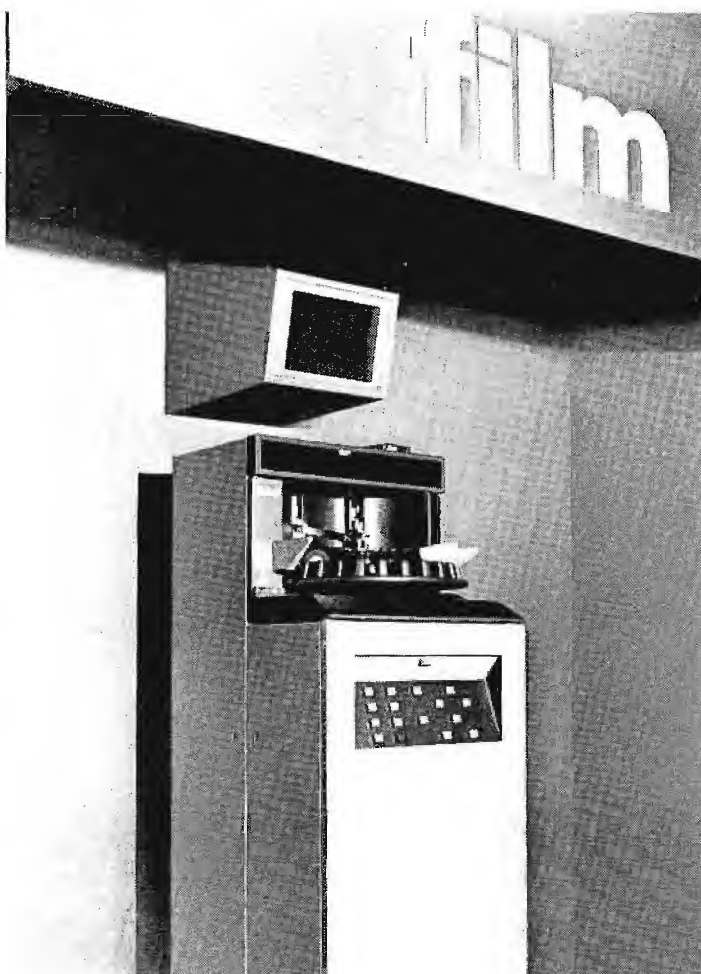
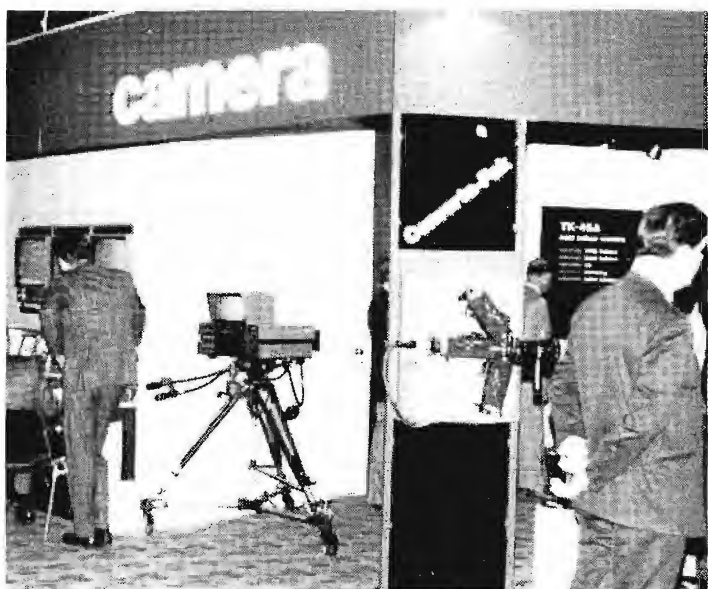
Here's everything new and interesting on display at RCA's Montreux exhibit. Lovely Michaela and Wanda helped demonstrate the new TK-45A with four fully automatic features, and a color camera converted for back-pack use.

Other new entries in the field of automatic broadcasting were the TCP-1624 prototype film cartridge projector and TK-28 Telecine System.

The famous TCR-100 was shown in a new light. One in a theater presentation unfolded new ideas in programming. Another, with continuous record capability, showed how studio applications could be expanded.

The TR-70C with switchable standards made its impact on broadcasters who want to be able to record on one standard, play back on another; or exchange tapes for playback in another European country or world area.

TV producers, stations and networks were glad to see that the TPR-10 portable quadruplex allows studio quality wherever conventional equipment cannot go.





# When a low-priced broadcast camera looks like a good buy, keep right on looking.

Take a good look inside. Check out the design and construction features.

Then think about what they mean in terms of reliability, maintenance, and long-term picture quality after the camera has been put to a lot of hard, daily use.

Look at the RCA TK-630 color camera.

The heart of its optical system is a simple one-piece sealed prism rather than the ordinary arrangement of mirrors.

It's simpler to maintain; stays in perfect alignment; eliminates the secondary reflections that even slight contamination of mirror surfaces can cause.

And for stability, the entire optical system is mounted on a sturdy bed-plate for extra rigid support of pickup tubes, lens and prism.

The result? Less shock and vibration. Extra dependability. And pictures that stay sharp and true.

Components are easily accessible so maintenance is fast and simple. The pickup tubes for example, can be replaced in two minutes. Without disturbing the

optical alignment and causing deterioration of picture quality.

Circuit modules are easy to get at, too. And they're totally solid state for compactness and long life.

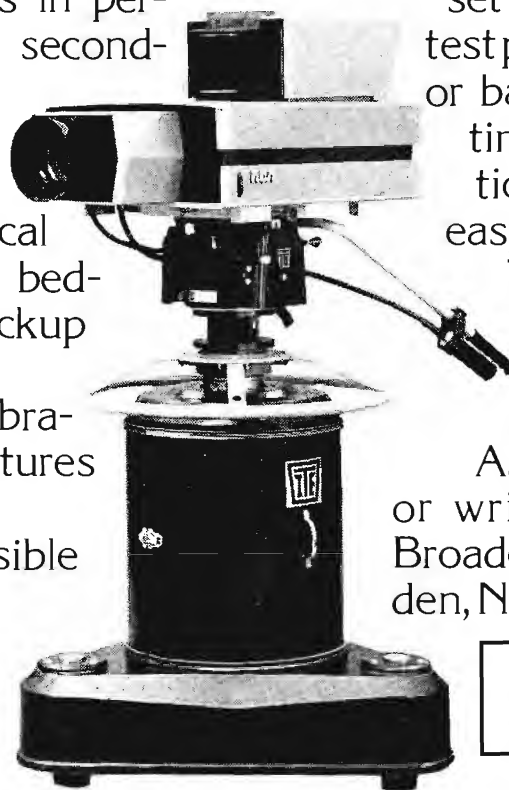
And the TK-630 is made for portability—with a plug-in detachable viewfinder and carrying handle that make it easy for one man to carry.

There are other quality features which set the TK-630 apart: Calibrated test pulse; built-in encoder with color bar generator; automatic pulse timing; deflection failure protection; electronic lens capping, easy setup. And many more.

The new low price is the first thing that looks good about the TK-630.

But by no means the last.

Ask your RCA Representative, or write for new brochure. RCA Broadcast Systems, Bldg. 2-5, Camden, N.J. 08102.



# RCA

## New TK-630 color camera.

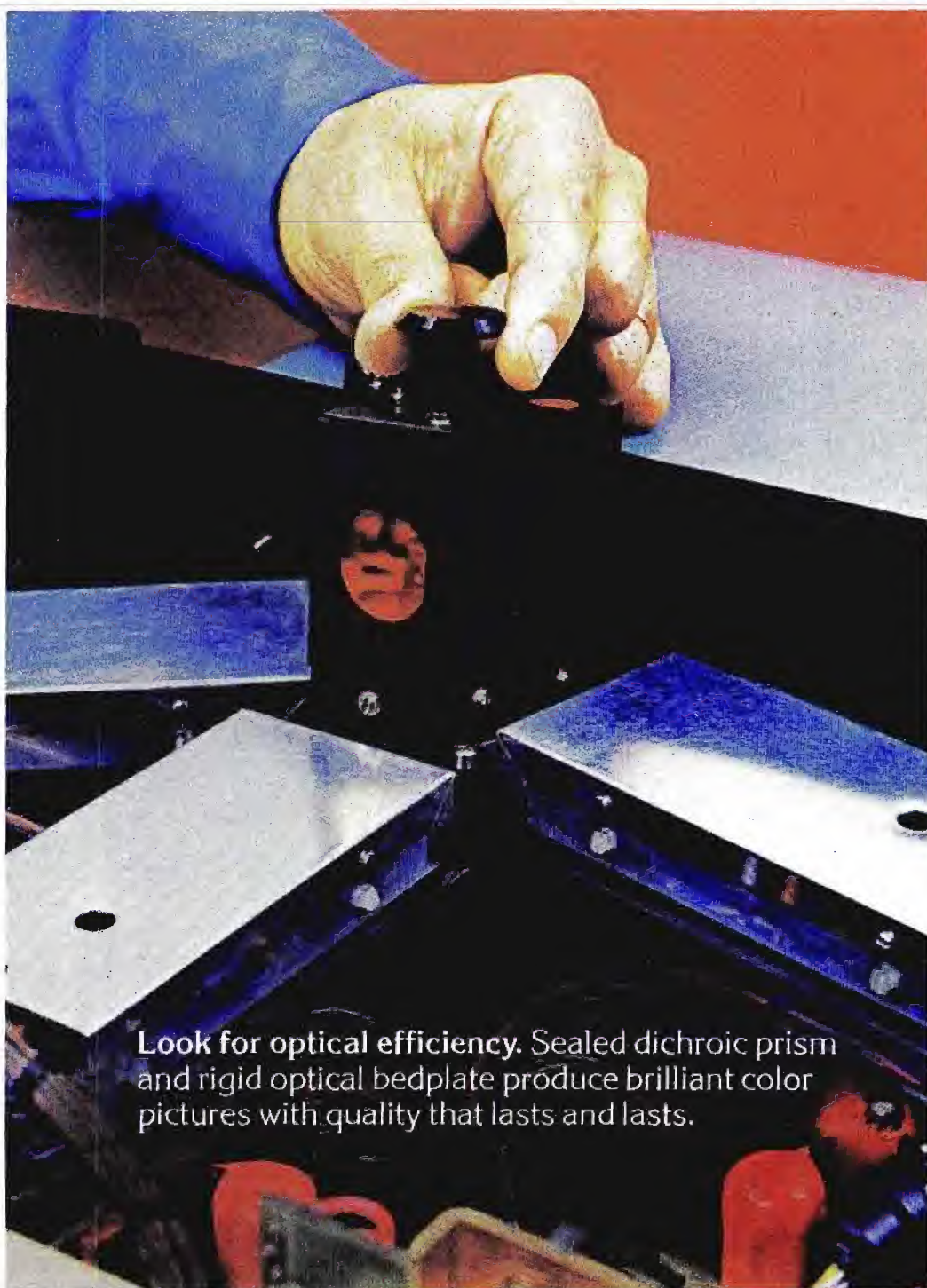




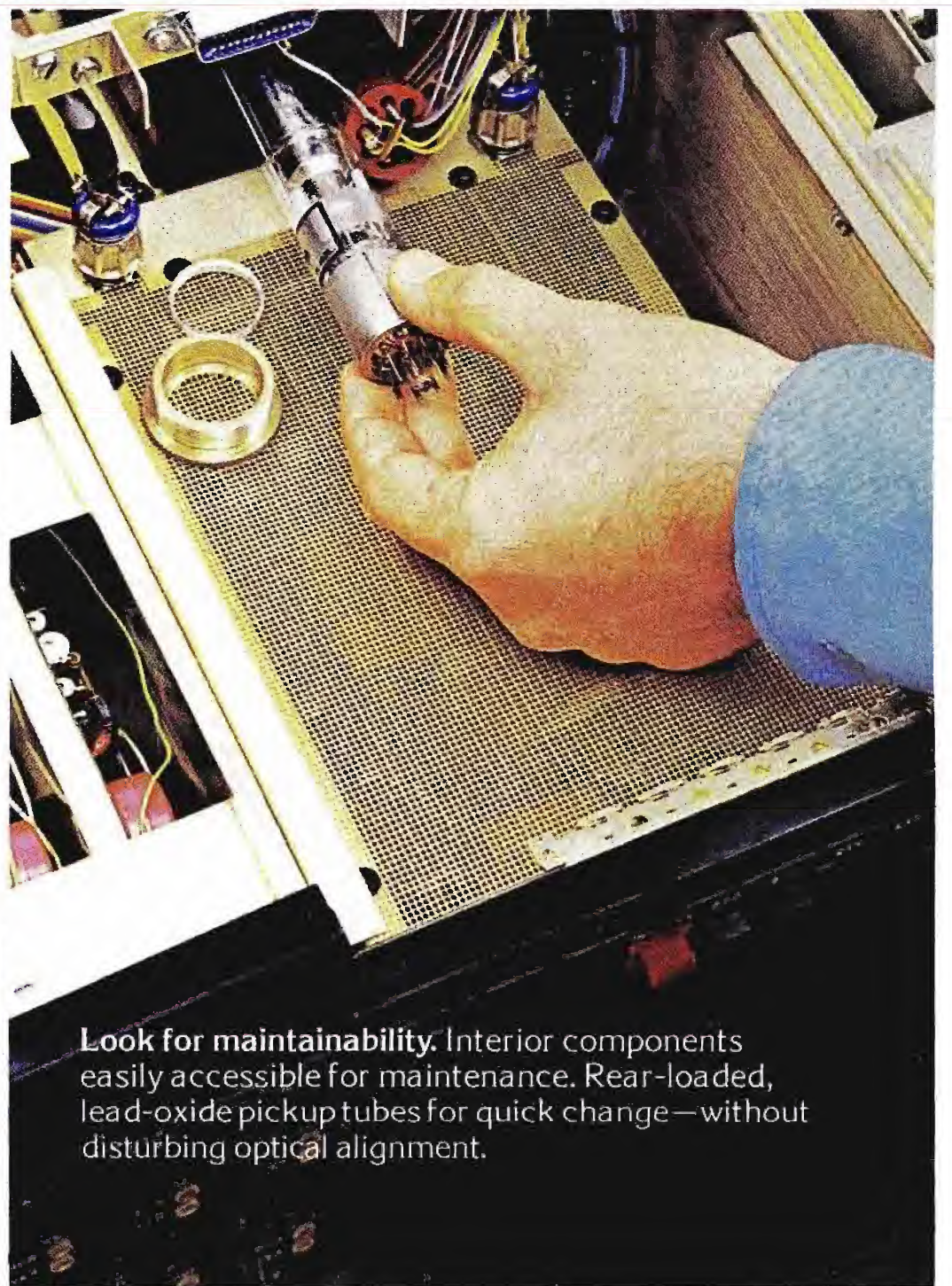
Look for **versatility** in field or studio use. Plug-in viewfinder quickly detaches for easy portability.



Look for **rugged construction**. An extra measure of design integrity. Sturdy circuit boards take hard knocks. Premium components for extra life.



Look for **optical efficiency**. Sealed dichroic prism and rigid optical bedplate produce brilliant color pictures with quality that lasts and lasts.



Look for **maintainability**. Interior components easily accessible for maintenance. Rear-loaded, lead-oxide pickup tubes for quick change—without disturbing optical alignment.



